1

BRIAN MURPHY, Ph.D., 3-25-09

1 IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OKLAHOMA 2 3 W.A. DREW EDMONDSON, in his) 4 capacity as ATTORNEY GENERAL) OF THE STATE OF OKLAHOMA and) 5 OKLAHOMA SECRETARY OF THE 09:03:16) ENVIRONMENT, C. MILES TOLBERT) 09:03:16 6 in his capacity as the TRUSTEE FOR NATURAL RESOURCES) 7 FOR THE STATE OF OKLAHOMA, 8 Plaintiff, 9 vs.)4:95-CV-003290-TCK-SAJ (VOLUME I) TYSON FOODS, INC., et al., 10 09:03:16 09:03:16 Defendants. 11) 12 13 14 15 09:03:16 VOLUME I OF THE VIDEO DEPOSITION OF BRIAN 16 17 MURPHY, Ph.D., produced as a witness on behalf of the Defendants in the above styled and numbered 19 cause, taken on the 25th day of March, 2009, in the 20 City of Tulsa, County of Tulsa, State of Oklahoma, 09:03:16 before me, Karla E. Barrow, a Certified Shorthand 21 Reporter, duly certified under and by virtue of the 22 23 laws of the State of Oklahoma. 24 25 09:03:16



	3
1 APPEARANCES	1 (Whereupon, the deposition began at 9:07
2 3	2 a.m.)
4 FOR THE PLAINTIFF: MR. DAVID PAGE	3 VIDEOGRAPHER: We are now on the record
Attorney at Law	4 for the deposition of Dr. Brian Murphy. Today is
5 502 West 6th Street 09:03:16 Tulsa, OK 74119 09:03:16	5 March 25th, 2009. The time is 9:06 a.m. Counsel, 09:07:05
6	6 please identify yourselves for the record.
FOR CARGILL: MS. THERESA N. HILL 7 MR. JOHN TUCKER	7 MR. PAGE: David Page, representing the
Attorney at Law	
8 100 West 5th Street Suite 400	,
9 Tulsa, OK 74103	9 MS. COLLINS: And Melissa Collins from
and 10 MS. MELISSA COLLINS 09:03:16	10 Faegre & Benson on behalf of Cargill Turkey 09:07:12
Attorney at Law 09:03:16	11 Production and Cargill, Inc.
11 1700 Lincoln Street	12 MS HILL: Theresa Hill on behalf of
Suite 3200 12 Denver, CO 80203	13 Cargill, Inc. and Cargill Turkey Production.
13 FOR GEORGE'S: MR. JAMES GRAVES	14 VIDEOGRAPHER: And on the phone?
Attorney at Law 14 221 North College	15 MS. HILL: Vicki? 09:07:19
Fayetteville, AR 72701	16 MS. BRONSON: Vicki Bronson for Simmons
15 09:03:16 FOR SIMMONS: MR. JOHN ELROD 09:03:16	17 Foods.
FOR SIMMONS: MR. JOHN ELROD 09:03:16 16 MS. VICKI BRONSON	18 VIDEOGRAPHER: Thank you. You may now
(Via Telephone)	19 swear in the witness.
17 Attorney at Law 211 East Dickson Street	20 BRIAN MURPHY, Ph.D., 09:07:22
18 Fayetteville, AR 72701	being first duly sworn to tell the truth, the whole
19 VIDEOGRAPHER: MR. DEREK ANDERSON 20 ALSO PRESENT: DR. ROGER OLSEN 09:03:16	truth and nothing but the truth, testified as
21	1
22 23	23 follows:
24	24 DIRECT EXAMINATION
25	25 BY MR. PAGE: 09:07:22
2	4
1 INDEX	1 Q Good morning, Dr. Murphy.
2 WITNESS PAGE	2 A Good morning.
3	3 Q Would you give us your name and address,
4 BRIAN MURPHY, Ph.D.	4 please?
5 Direct Examination by Mr. Page 4 09:03:16	5 A Brian Murphy, 2033, Suite 210, 2033 Wood 09:07:29
09:03:16	6 Street, Suite 210, Sarasota, Florida.
6 Signature Page 285	7 Q And have you ever given any sworn testimony
Reporter's Certificate 286	8 like you're giving today?
7	9 A Yes, I have.
8	10 Q Okay. Would you please outline for us the 09:08:10
9	testimony you've given in the past and the type of
10 09:03:16	work you were doing? What I'm really interested in
11	?
12	•
13	domestic or criminal or any kind of what I'm
14	15 focusing on here is just your testimony where you've 09:08:21
15	16 operated as an expert witness.
16	17 A Well, I could give you more specifics looking
17	18 at my resume.
18	19 Q Okay.
19	20 A Which outlines all the testimony. 09:08:26
20	21 Q Okay. Let's do that then. I've got a copy of
21	22 your report, which has your resume or CV attached,
22	23 and we'll mark that as Exhibit No. 1. What we'll do
23	24 first is ask you if you would review that and tell
24	
25	
3	5

2 (Pages 2 to 5)

		}	
1	PAH contamination, and the issue was which of the	1	arsenic and lead, which, again, were the
2	successive owners had contributed the contamination	2	contaminants of concern.
3	and to what degree. It was an allocation case.	3	Q Did you issue a report in that case?
4	Q And what analysis did you employ to do your	4	A Yes.
5	work in that case? 09:14:11	5	Q Would you have any objection to providing 09:16:27
6	A I started with a multivariate analysis, and	6	counsel a copy of that report to turn it over to me?
7	then after I saw what that was providing me, I did	7	A I believe the case is in mediation. I believe
8	go into a different kind of analysis, which was	8	the report is confidential.
9	basically a mass balance. I was able, through	9	Q Would you check into that, please?
10	stoikiometry, to calculate how much lead and arsenic 09:14:19	10	A Sure. 09:17:03
11	each of the parties had contributed over time.	11	Q Does the report contain your PCA analysis?
12	Q Was that when you say stoikiometry, were	12	A No, it does not.
13	you talking about the mass balance approach in that	13	Q Why not?
14	case?	14	A Because I didn't find that to be the most
15	A Yes. 09:14:27	15	useful way to deliver my results. 09:17:11
16	Q Do you find that mass balance is a probative	16	Q Did you primarily rely upon both the
17	line of evidence to determine sources of	17	evaluation of the contaminants and where they were
18	contamination?	18	located along with mass balance to reach your
19	A It can be.	19	conclusions?
20	Q And would you describe the multivariate 09:15:04	20	MS. COLLINS: Object to form. 09:17:21
21	process you employed in this phosphorus case?	21	A That's roughly correct, yes.
22	A It was a principal component analysis based on	22	Q (By Mr. Page) Was there anything else that
23	a number of metals to see if there were differences	23	you used to employed to reach your conclusions in
24	on different locations on the site and the	24	that case?
25	composition of the contamination. 09:15:13	25	A Well, I did fingerprinting of some PAH samples 09:17:27
	10		12
		·}······	
1	Q And what were the media that you investigated	1	to see what their composition reflected.
2	in this particular instance?	2	Q Okay. What do you mean by fingerprinting?
3	A Soils and groundwater, and I believe some	3	A Looking at the individual PAHs and seeing
4	sediment samples, as well.	4	whether they were characteristic of fuels or urban
5	Q And when you did your PCA analysis, did you do 09:15:19	5	runoff or what. 09:18:06
6	your soils and groundwater analysis in the same runs	6	Q Is that an effective method to evaluate source
7	as the same you combined the medias?	7	with PAHs, fingerprinting?
8	A I don't believe in that case that I did.	8	A It can be.
9	Q Why not?	9	Q And why is that?
10	A Well, I was really just trying to feel my way. 09:15:28	10	A Well, different fuels have a composition 09:18:12
11	I find that principle component analysis is most	11	that's different than urban runoff, which in turn
12	useful for seeing what's going on in a site and not	12	has a composition that's different than manufactured
13	necessarily the best technique for explaining it to	13	gas plant waste, which is also where it's commonly
14	a judge or jury, and so I was really just trying to	14	used.
15	find my way, and my conclusion was that the 09:16:08	15	Q Is there published literature that identifies 09:18:22
16	contamination was pretty uniform across the site.	16	the fingerprints identified with those different
17	Wherever there was buried pyrite, you found this	17	sources?
18	contamination.	18	A Yes, there is.
19	Q What about in the groundwater?	19	Q Is it also true that PAH fingerprinting
20	A That was the contamination there was 09:16:14	20	analysis can be effective because the PAHs 09:18:28
21	downgradient of buried pyrite.	21	structurally tend to maintain their structure as it
22	Q Were you able to establish any relationship	22	processes through the environment?
23	between the groundwater contamination and the soils	23	A Well, they do maintain their structure, but
24	contamination that you investigated?	24	they don't move together through the environment.
25	A Only that it was downgradient and it contained 09:16:20	25	Different PAHs move at different rates, for example, 09:19:09
	11		13
		4	

4 (Pages 10 to 13)

1		
1	in groundwater.	1 A Yes.
	_	2 Q Have you ever employed mass balance analysis
3		3 for source determination in any other action?
4		4 A Well, it depends on how broadly you define
]	•	5 mass balance. I have a number of cases where I've 09:22:15
6		6 estimated emissions to air, and then estimated what
7		the resulting concentrations would be downwind, and
6	<u></u>	8 in a sense, that's a mass balance.
		9 Q Have you ever employed mass balance to get an
10	5	10 understanding or a sense at a particular 09:22:23
111		11 contamination site as to what the most likely
12		12 significant contributors of a contaminant may be,
13	. 5	and that's when you're investigating sources?
1		
14	,	\$
15		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
16	5 5.	forensics, do you find that that is probative or
1	. , , ,	helpful in identifying the likely significant contributors of a contaminant to a site?
18	· ·	
19	,	19 A It can be. 20 Q We were talking about your testimony before I 09:23:26
20	3	3
2:		got off on a little tangent there on mass balance.
22	• •	You've identified, I think, four pieces of
23	•	23 testimony, the last one, I think was on phosphorus.
24		24 In that particular case, did you give any court 25 testimony? 09:24:09
25	5 source of those contaminants? 09:20:19	
1	14	16
	1 A You could do that, yes.	1 A No.
	· ·	3
1 :	Q Is that a method that's commonly employed in	2 Q Are there any other sworn testimony as an
1	Q Is that a method that's commonly employed in environmental investigations of sources?	2 Q Are there any other sworn testimony as an 3 expert that are not on your resume that you can
:		3 expert that are not on your resume that you can 4 recall at this time, sir?
	3 environmental investigations of sources?	3 expert that are not on your resume that you can
	environmental investigations of sources? A I don't know how common it is. I've done it	3 expert that are not on your resume that you can 4 recall at this time, sir?
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26	 expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. O9:20:26 Q Did you find it to be effective in that case?	 expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check.
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did.	 expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this	 expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition,
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in
1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir.
1 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in
1:11	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person
1:11:11:11:11:11:11:11:11:11:11:11:11:1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04
10 11 11 11 11 11 11 11 11 11 11 11 11 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person
	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid.	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04
10 11 11 11 11 11 11 11 11 11 11 11 11 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there
11 1 1 1 1 1 1 1 1 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he
11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how 09:21:22	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a
10 11 11 11 11 11 11 11 11 11 11 11 11 1	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how 09:21:22	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case.
11 11 11 11 12	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how much lead and arsenic were being generated and	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case. Q Did you employ traditional risk assessment 09:25:15
11 1 1 1 1 1 1 1 2 2 2	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how much lead and arsenic were being generated and disposed of on-site during different time periods.	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case. Q Did you employ traditional risk assessment 09:25:15 exposure of techniques in your analysis?
1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how much lead and arsenic were being generated and disposed of on-site during different time periods.	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case. Q Did you employ traditional risk assessment 09:25:15 exposure of techniques in your analysis? A My part of the case was to calculate
1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how much lead and arsenic were being generated and disposed of on-site during different time periods. Q Was that mass balance used to identify which	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case. Q Did you employ traditional risk assessment 09:25:15 exposure of techniques in your analysis? A My part of the case was to calculate exposures, and someone else then translated those
1. 1. 1. 1. 1. 1. 1. 1. 1. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	environmental investigations of sources? A I don't know how common it is. I've done it in one case. 09:20:26 Q Did you find it to be effective in that case? A I did. Q Could you give me a little bit of an explanation of how you employed mass balance in this particular phosphate case? 09:21:02 A The plant had a manufactured sulfuric acid through burning pyrite, which is an iron and sulfur compound, and we knew how much super phosphate they were making, we knew how much sulfuric acid you needed to add to the ore in order to produce that 09:21:13 much super phosphate, and we knew how much pyrite you had to burn to produce that much sulfuric acid. And when you from that, you can calculate knowing the level of impurities of arsenic and lead in pyrite, you can calculate how much iron how much lead and arsenic were being generated and disposed of on-site during different time periods. Q Was that mass balance used to identify which of several owners had contributed the most to the	a expert that are not on your resume that you can recall at this time, sir? A Not that I can recall at this time. There may 09:24:14 be, but I'd have to check. Q Okay. So, now let's maybe refer to Page 19 of your CV, which is in Exhibit 1 to your deposition, and I see there's quite a few listed here, so if you could just name a party and give us a brief 09:24:25 statement as to the issue you were investigating in that case, sir. A The first one, the Hoffman case, involves a toxic tort where the claim was made that a person had been made to wash floors with trichloroethylene, 09:25:04 and as a result, had become ill. And my role there was to estimate what levels of trichloroethylene he would have been exposed to. So in a sense, that's a mass balance case. Q Did you employ traditional risk assessment 09:25:15 exposure of techniques in your analysis? A My part of the case was to calculate exposures, and someone else then translated those into health risks.

5 (Pages 14 to 17)

г		
١	1 Q I'm sorry to interrupt you there, sir. Was	1 that were being found on-site and whether they were
l	2 that the alleged polluter in that case?	2 consistent with what LILCO used in their
١	3 A It was - I think it was more a case of it was	3 transformers.
1	4 the present owner, and that the alleged pollution	4 Q And what did you determine?
ı	5 had occurred earlier prior to their ownership. 09:35:29	5 A Well, again, my determination was that LILCO 09:38:08
ı	6 Q On the present owners' premises?	6 had contributed very little to what was found
ı	7 A Yes.	7 on-site.
1	11 200	8 Q Okay, sir. Can you go to the next, James
١		9 Barnett case, please, sir?
1		' · · · · · · · · · · · · · · · · · · ·
-	3 ,	
	11 the extent to which LILCO's transformers had	,
-	12 introduced the PCB contamination that was found	• '
-	13 there.	13 A That's actually one of a series of cases all
1	14 Q And so PCBs were the chemicals of concern at	at the Brio site in Friendswood, Texas, and in each
- 1	15 that site? 09:36:17	15 of those cases the issue is the same. It's buried 09:38:24
- 1	16 A Yes.	16 tars in the ground. They were actually stored in
- 1	17 Q And who did you represent?	pits, and then the theory was that the volatile
- 1	18 A The insurers.	18 compounds were emitted from the pits and drifted
- 1	19 Q Was it an insurance coverage claim, sir?	19 over into a near neighborhood.
١	20 A Yes. 09:36:21	20 Q Was it an air contamination case? 09:39:03
١	21 Q And in that case, what analysis did you employ	21 A Yes.
ı	22 to determine the source of the PCBs?	22 Q And what were the contaminants of concern
	23 A Actually, that's a mass balance case because	23 there, sir?
	24 what I did was I looked at how many transformers and	24 A They were various products from vinyl chloride
	what size had been disposed there, looked at what 09:36:28	25 tars and styrene tars, including vinyl chloride 09:39:09
ı	26	28
ŀ		
Ì	1 the typical content would have been, and then	1 monomer, and I believe 1,2 dichloroethane.
1	2 compared that mass of PCBs with the mass that was	2 Q Nasty stuff?
1	3 actually found on-site.	3 A Insufficient concentrations.
١	4 Q And what did you determine?	4 Q That's pretty much the same for everything,
1	5 A That LILCO had disposed of only a very small 09:37:04	5 isn't it. Can you tell me, sir, in that case, did 09:39:15
1	6 portion of the PCBs that had been found on-site.	6 you employ any PCA analysis?
ı	· ·	7 A Not in that case.
1		
1	,	
١	, , ,	9 your investigation there?
	10 transformers that they employed and disposed there? 09:37:14	10 A I did, and also emissions modeling. 09:39:21
	11 A Yes.	11 Q What do you mean by emissions modeling?
١	12 Q Did you also look at other sources of PCBs as	12 A Well, the say the vinyl chloride monomer is
	13 part of your mass balance?	contained in a tar, and so in order to estimate the
	14 A Not as part of the mass balances. I did look	14 release of monomer, you have to model its transport
	15 at some of the other sources of PCBs that were 09:37:21	15 through the tar to the surface of the tar and then 09:40:02
	16 on-site.	16 through the soil.
	17 Q Did you employ any other analysis other than	17 Q And who did you represent in that case?
١	18 the mass balance analysis that you've described so	18 A Attorneys from Monsanto.
١	19 far?	19 Q The alleged polluter in that case?
	20 A I don't recall that I did. 09:37:25	20 A Again, there was an issue as to whether they 09:40:10
-	21 Q Did you employ any PCA analysis in that case,	21 had contributed at all or whether it was a prior
-	22 sir?	22 owner.
-	23 A Not in that case.	23 Q Okay. We'll go to the next case, sir. That
-	24 Q Any fingerprint analysis for the PCBs?	24 was a group of cases, they all had similar
1	25 A I think I looked at what the aroclors were 09:38:01	25 circumstances 09:40:17
1	27	29

8 (Pages 26 to 29)

1	at trial?	1 Q That was before an administrative law judge?
2	A I testified on when the plume when the	2 A Yes.
3	release had occurred that formed the groundwater	3 Q Was there any PCA employed in that case?
4	plume.	4 A Not in that case.
5	Q Okay. And was there a Daubert challenge in 10:00:08	5 Q Have you ever testified, either in deposition 10:02:13
6	that case?	6 or trial prior to today, where your
7	A No.	7 opinions expert opinions involved PCA analysis?
8	Q And would you go to the next one, sir?	8 A I've testified at depositions where I had used
9	A Testimony before an administrative law judge	9 PCA to reach my in part to reach my conclusions,
10	regarding expansion of Flying Cloud landfill. 10:00:11	10 but I wasn't deposed on the PCA analysis. 10:02:27
11	Q Flying Cloud landfill. We haven't talked	11 Q The only case that I recall from our just
12	about that case before, have we, sir?	12 going through these was the phosphate fertilizer
13	A No, we haven't.	13 case where you said you employed PCA, but it didn't
14	Q What were the issues involved in that	14 ultimately end up in your opinion; is that correct?
15	particular matter? 10:00:17	15 A That would be the only deposition. I do have 10:03:06
16	A There was a move to expand the landfill, but	one other case, not including this one, where I used
17	at the same time to install various control	PCA analysis to reach my conclusions.
18	equipment, flare stacks and so on, and the issue was	18 Q Is that identified in your CV that's before
19	what would how would the resulting emissions and	19 you, sir?
20	downwind concentrations compare after the expansion 10:00:23	20 A It is identified. It's not in the depositions 10:03:11
21	with the current situation.	and trials because it hasn't reached that stage yet.
22	Q So your focus was on air contaminant	22 Q Could you show us on the CV that's before you
23	transports?	23 in Exhibit 1 that entry for that matter, sir?
24	A Yes.	24 A Well, I appear to have misspoken because it
25	Q Any PCA analysis in that case? 10:00:32	doesn't appear to have made it into this version of 10:03:32
	46	48
		<u>}</u>
1	A Not in that case.	1 my CV, which is an older version.
2	Q Okay. Next one, sir.	2 Q Okay. Would you just describe that particular
3	A The James Slaughter, et ux, is one of the Brio	3 matter for us, sir?
4	cases.	4 A It involves contamination at a location in
5	Q Okay. And the subject you testified at trial 10:01:06	5 Maine, in a harbor in Maine, and the issue was 10:04:04
6	in that case?	6 whether the contamination results from a
7	A Emissions and downwind concentrations from	7 manufactured gas plant that's located not too far
8	pits in which styrene and vinyl chloride tars were	8 away, whether it results from historical coal
9	stored. Also, I testified as to how the	9 storage along the river front and/or whether it
10	concentrations were measured in the neighborhood of 10:01:14	10 results from some other type of source. 10:04:15
11	various air contaminants compared with	11 Q What are the chemicals of concern?
12	concentrations elsewhere in Texas.	12 A The chemicals of concern are various tars
13	Q So your testimony at trial in that case	13 containing PAHs, as well as mono-cyclic compounds
14	concerned air emissions and their transport?	14 such as benzine.
15	A And the air concentrations, yes. 10:01:21	15 Q And what media has been contaminated? 10:04:23
16	Q Any Daubert challenge in that case?	16 A Sediments in the river, as well as soils, but
17	A No.	17 I believe a remediation is mostly of the sediments
18	Q And I recall there was no PCA in that case;	18 in the river.
19	correct?	19 Q And how did you employ PCA in your analysis in
20	A Not in that case. 10:01:25	20 that case? 10:05:01
21	Q And the last matter, sir?	21 A I looked at the fingerprint of the various
22	A That involved a proposal to bring oil tankers	22 locations, locations associated with the
23	into Puget Sound from Alaska, and my role was to	23 manufactured gas plant, locations associated with
24	look at what an explosion of an oil tanker would	24 the a historic pipeline leading down to the
25	look like in terms of the resulting damage. 10:02:06	25 harbor, looked at the fingerprint in the sediments, 10:05:10
	100% mile III termine of mile termine B.)
1	47	49

13 (Pages 46 to 49)

		· · · · · · · · · · · · · · · · · · ·
1	as well as in the soils.	1 evaluation that you employed in Section 5 of your
2	O Did your PCA involve more than one media?	2 report for this case?
3	A It did, although not at the same time.	3 A That's my recollection.
4	Q Okay. So you did a separate, let's say,	4 Q I want to ask you a few more questions on your
5	liquids media PCA from a solids media PCA? 10:05:20	5 CV, sir, which is Exhibit 1. If you would turn back 10:29:15
6	A Yes.	6 to that, I just have a couple of more questions, I
7	Q Why did you not combine them together in that	7 think, on that. If you turn to Page 7 of your CV
8	case?	8 that's part of Exhibit 1, I think this is under your
9	A Well, because the fingerprint isn't preserved	9 writings or your publications section, and there's
10	going from one medium to another. Again, different 10:05:26	an entry here, it's the fourth entry down, says, 10:30:01
11	PAHs have different transport properties in the	11 Murphy BL, I assume that's you?
12	environment.	12 A Yes.
13	MR. PAGE: Let's take a break.	13 Q As the principal author, and it says,
14	VIDEOGRAPHER: We are going off the	14 mathematical modeling, physical science issues in
15	record. The time is now 10:05 a.m. 10:06:04	15 natural resource damage assessment. Did I read that 10:30:0
16	(Following a short recess at 10:06 a.m.,	16 correctly, sir?
17	proceedings continued on the record at 10:27 a.m.)	17 A Yes.
18	VIDEOGRAPHER: We are back on the record.	18 Q Okay. Could you describe briefly what the
19	The time is 10:26 a.m.	19 work you did in that particular presentation?
20	Q (By Mr. Page) Dr. Murphy, before the break, 10:27:07	20 A My that was a long time ago and so my 10:30:14
21	we were discussing some of your past experiences	21 recollection may not be complete, but my
22	professionally, and my recollection is is that what	22 recollection is that the mathematic modeling
23	you testified so far, and if you would confirm this,	23 involved was involved in describing the transport of
24	you employed PCA on two occasions that we've talked	24 materials from compartment to compartment, each
25	about, one at the phosphorus plant and one involving 10:27:18	25 compartment representing a different environmental 10:30:22
	50	52
1	a gas plant releases in a Maine harbor; is that	1 medium.
1 2	a gas plant releases in a Maine harbor; is that correct?	1 medium.2 Q And why is that important, sir?
1	• •	
2	correct?	2 Q And why is that important, sir?
2	correct? A In addition to this case, yes.	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection
2 3 4	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career,	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern,
2 3 4 5	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01
2 3 4 5 6	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times?	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and
2 3 4 5 6 7	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your investigations three times? A On specific cases, yes.	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection.
2 3 4 5 6 7 8	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your investigations three times? A On specific cases, yes. Q What about I want to make sure we're	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10
2 3 4 5 6 7 8 9	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection.
2 3 4 5 6 7 8 9	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10 11 the constituents of concern, is that what you're 12 talking about?
2 3 4 5 6 7 8 9 10	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10 11 the constituents of concern, is that what you're 12 talking about? 13 A That's my recollection, yes.
2 3 4 5 6 7 8 9 10 11 12	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10 11 the constituents of concern, is that what you're 12 talking about? 13 A That's my recollection, yes. 14 Q I'm going to go to the next one I've
2 3 4 5 6 7 8 9 10 11 12	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18
2 3 4 5 6 7 8 9 10 11 12 13 14	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about — I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work,	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10 11 the constituents of concern, is that what you're 12 talking about? 13 A That's my recollection, yes. 14 Q I'm going to go to the next one I've 15 identified I'd like to ask a question about, sir, 10:31:18 16 it's a couple of pages forward on Page 10, about
2 3 4 5 6 7 8 9 10 11 12 13 14 15	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14	2 Q And why is that important, sir? 3 A Well, very often you want to make a connection 4 between a source and a receptor that's of concern, 5 and in order to do that properly, you need to have 10:31:01 6 both the source and the receptor in your model, and 7 you need to be able to talk about how things 8 transform or change as you go from compartment to 9 compartment in order to make that connection. 10 Q And did this involve the chemical changes in 10:31:10 11 the constituents of concern, is that what you're 12 talking about? 13 A That's my recollection, yes. 14 Q I'm going to go to the next one I've 15 identified I'd like to ask a question about, sir, 10:31:18 16 it's a couple of pages forward on Page 10, about 17 halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about — I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work,	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions,
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma;
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but you employed PCA to determine or help identify the 10:28:21	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but you employed PCA to determine or help identify the 10:28:21	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29 A Yes. Q Would you describe that circumstance for us?
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but you employed PCA to determine or help identify the 10:28:21 sources of contamination in the environment?	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29 A Yes. Q Would you describe that circumstance for us? A That was an NPDES suit. I was retained by the
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but you employed PCA to determine or help identify the 10:28:21 sources of contamination in the environment? A Not that I can recall at this time. Q And is it fair for me to understand that in the two cases prior to the present case, when you	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29 A Yes. Q Would you describe that circumstance for us? A That was an NPDES suit. I was retained by the Department of Justice, and the issue was the dioxins
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Correct? A In addition to this case, yes. Q Okay. So in all of your professional career, if you include this case, you've used PCA in your 10:27:27 investigations three times? A On specific cases, yes. Q What about I want to make sure we're speaking the same language, so to speak. Have you employed PCA in any other professional 10:28:07 investigations, may not have been associated with litigation or a case, other than what you've testified to so far today? A Oh, I've edited a textbook that has a chapter on PCA, and I did edit that chapter and made various 10:28:14 corrections, so that's part of my professional work, also. Q Okay. Any other source investigations where you may not have been involved in litigation, but you employed PCA to determine or help identify the 10:28:21 sources of contamination in the environment? A Not that I can recall at this time. Q And is it fair for me to understand that in	Q And why is that important, sir? A Well, very often you want to make a connection between a source and a receptor that's of concern, and in order to do that properly, you need to have 10:31:01 both the source and the receptor in your model, and you need to be able to talk about how things transform or change as you go from compartment to compartment in order to make that connection. Q And did this involve the chemical changes in 10:31:10 the constituents of concern, is that what you're talking about? A That's my recollection, yes. Q I'm going to go to the next one I've identified I'd like to ask a question about, sir, 10:31:18 it's a couple of pages forward on Page 10, about halfway down the page, 1, 2, 3, 4, 5, 6, sixth entry where it says, estimated chemical emissions, including metals and dioxins in Muskogee, Oklahoma; do you see that? 10:31:29 A Yes. Q Would you describe that circumstance for us? A That was an NPDES suit. I was retained by the

14 (Pages 50 to 53)

1	and their transport off-site and into nearby bodies	1 go down under solvents, 1, the fifth down, that was
2	of water. It my role, in addition to doing the	2 the Nebraska facility. Was that the same facility
3	modeling, was also to collect some samples and have	3 that we discussed earlier as part of your deposition
4	5,	4 testimony involving TCE and 1,1,1-trichloroethane?
5	them analyzed for dioxins and furans. O And where did you collect the samples? 10:32:19	5 A That's the same case, yes. 10:36:07
	2	6 Q And that's where you talked about using mass
6	A On-site, near the wire burning operation.	7 balance already; right?
7	Q Were they in the soils on-site?	,,, ,
8	A They were in the soils, yes.	
9	Q Did you do any sampling in the water bodies	9 Q All right, sir. Next page, the second from 10 the bottom on Page 16 of your CV. it involves a 10:36:15
10	that were associated with the NPDES discharge? 10:32:28	and bottom one age to enjoy and any and any
11	A I did not.	11 Camden, New Jersey, site?
12	Q If we could go forward, sir, to Page 12 of	12 A Yes.
13	your CV, there's an entry towards the bottom of the	13 Q It says there, to determine the source of the
14	page says, metal inorganics, and the first entry	14 contamination, both mass balance estimates and
15	says, performed statistical analysis to identify 10:33:10	15 groundwater modeling were used. Would you please 10:36:23
16	sources of lead and arsenic at a Mid-Atlantic	describe the mass balance analysis you employed in
17	phosphate plant. Is that investigation that's	17 that case?
18	described there on Page 12 the one that we discussed	18 A My recollection is that one of the issues was
19	earlier this morning concerning your phosphate	19 whether an electroplating facility had contributed
20	analysis? 10:33:18	20 to contamination of a nearby well field, and we were 10:37:01
21	A Yes, it is.	21 able to estimate what the discharge of let's see,
22	Q Okay. If you would go forward now, sir, to	22 it was chromium and solvents were from that
23	let's see would you look at Page 15 of your CV,	23 electroplating facility and see if it matched what
24	sir. Under solvents, the second entry, would you	24 was being found in the well field.
25	read that, please? 10:34:08	25 Q And could you tell me how mass balance was 10:37:11
ļ	54	56
1	A Analyzed how and when chlorinated solvents	1 employed, specifically?
2		2 A You compare the mass disposed with the mass
1	entered the environment at a Kansas manufacturing	3 contained at the present time in the well field and
3	facility.	4 see if the two numbers make sense.
4	Q Could you briefly describe the analysis you	
5	employed in that particular evaluation? 10:34:14	
6	A In that particular case, there were a series	6 particular mass balance of other potential sources
7	of buildings that were built, one after another, and	7 for the chromium and the chlorinated solvents?
8	as each building was built, a degreaser was moved	8 A My recollection is that we did, but not in the
9	and the location where solvents were stored was	9 same detail as the electroplating facility.
10	changed, and we had the date of the buildings, and 10:34:24	10 Q And was that mass balance analysis probative 10:37:28
11	so by identifying the source of various plumes,	11 in that particular circumstance?
12	which building they emanated from, we were able to	12 A My recollection is that it was.
13	date the releases from each building.	13 Q Where are you currently employed, Dr. Murphy?
14	In that case, I used what I call the plume	14 A At Exponent.
15	reconstruction method, which is adding back the 10:35:02	15 Q And what is your title? 10:38:14
16	daughter products to the parent product, and we also	16 A Principal scientist.
17	used an anisotropic creaking to try to describe	17 Q What does that mean?
18	the plumes, and we were able to get definite plumes	18 A That's the highest technical rank in our
19	coming from each of from different buildings.	19 organization, and generally principals are also
20	Q Not necessarily in that case, sir, but in 10:35:13	20 stockholders in the company. 10:38:21
21	other environmental investigations, is it generally	21 Q Okay. And how are you compensated?
22	important in source identification to be able to	22 A I'm paid a salary, and I get an annual bonus.
23	identify where the release occurred?	23 Q Okay. And what is the basis for your bonuses?
24	A I would say that's generally the case.	24 A Oh, you know, it's never really been explained
25	Q And that same page on Page 15, sir, I want to 10:35:25	25 to me. 10:39:01
1-7	55	57
1	\mathcal{I}	÷ .

15 (Pages 54 to 57)

		1	
1	itself.	1	unimpacted field edge of field sample from
2	Q And you did this analysis after you submitted	2	unimpacted field to be compared to an edge of field
3	your report?	3	sample from a poultry disposed field?
4	A I looked at that particular one after I	4	A That would be one example. Another example
5	submitted the report, yes. 10:54:29	5	would be comparing an SPLP test on unimpacted soil 10:57:17
6	Q Anything else?	6	with an SPLP test on supposedly poultry litter
7	A Well, the third opinion would be that he's	7	impacted soil.
8	looked at other possible sources, such as cattle	8	Q So I guess what I'm trying to understand,
9	manure and wastewater treatment plants and so on,	9	then, Dr. Murphy, if we're talking about runoff from
10	but he hasn't looked at the most important other 10:55:04	10	unimpacted soils that go into streams, how could 10:57:25
11	source, and that is just native soils. It's clear	11	there be any chemical composition change in the
12	to me that his edge of field samples are dominated	12	sense that the unimpacted stream would not be
13	by components of native soils, and he has no idea	13	representative of runoff from unimpacted soils?
14	what the compound is because he's never done an SPLP	14	A Well, first of all, it's a great deal of
15	sample on native soils without poultry litter, 10:55:12	15	dilution that happens when you enter the stream. 10:58:05
16	without cattle manure, et cetera, just has no idea	16	Secondly, the partition in your variate chemicals is
17	what background is.	17	completely different, solid media and liquid media.
18	Q Wouldn't the reference stream samples serve as	18	It's controlled by things like solubility, like the
19	a background for such an analysis?	19	soil water partitioning coefficient and so on, and
20	A Not for the edge of field, no. 10:55:21	20	so the chemical signatures, I'd say changes going 10:58:14
21	Q How would they be different?	21	from medium to medium.
22	A Well, the surface stream samples are going to	22	Q Have you done any evaluation in the IRW to
23	be dominated by components that are dissolved in	23	demonstrate the opinion you just gave us?
24	surface water or are, you know, found in surface	24	A I have not attempted to find background in the
25	water naturally, whereas the native soils analysis 10:56:02	25	IRW. 10:58:22
	70		72
		·••·····	
1	is going to be dominated by components that are	1	Q Did you perform any analysis, SPLP analysis on
2	found in native soils, that are glommed particulates	2	unimpacted soils?
3	and so on.	3	A I have not done that at this date.
4	Q Wouldn't the runoff of impacted native soils	4	Q Have you done any collection and analysis of
5	be representative of the leachate you would find in 10:56:12	5	an edge of field sample on an unimpacted field? 10:58:28
6	the unimpacted streams?	6	A I have not.
7	A No. Again, the chemical signature changes	7	Q So you wouldn't be able, then, to compare what
8	going from medium to medium, and so looking at a	8	you think may be running off of an unimpacted field
9	stream, a reference stream is not going to do the	9	to a reference stream to see if there is, in fact,
10	same thing as looking at a reference soil. 10:56:21	10	any chemical changes? 10:59:08
11	Q Okay. But you were talking about looking at a	11	A Well, again, my comparison is edge of field
12	leachate or a runoff from a reference soil; correct,	12	sample from unimpacted field, to edge of field
13	sir?	13	sample from impacted field, or SPLP from native
14	A Yes.	14	unimpacted soil to SPLP from soils that are
15	Q Okay. And I understand how if you went from 10:56:26	15	impacted. Again, I'm not making a comparison of 10:59:18
16	the solids to the liquid medium medium that would	16	stream to soil.
17	could be a change, but I'm trying to understand. I	17	Q But I guess I guess the same question,
18	thought your criticism was concerned with Dr. Olsen	18	though, a similar question is that you don't have
19	didn't look at runoff from a reference soil and	19	the analysis to demonstrate your point, do you, sir?
20	compare it to the streams; is that correct? 10:57:05	20	A And neither does Dr. Olsen. As far as I know, 10:59:25
21	A That is basically correct, yes.	21	none of his measurements tell you what background
22	Q So my question	22	is.
23	A Oh, not as compared to a stream, compare it to	23	Q Background for an edge of field?
104	the edge of field samples.	24	A Yes.
24			
25	Q Oh, so you would want the runoff from an 10:57:09	25	Q Did you do any investigation of the components 11:00:01

19 (Pages 70 to 73)

effectively, I think you've got to do a multimedia calculation. But that's not the only way to do it. You could do a 4 Q Are you talking about - let me just interrupt for a second, a multimedia PCA activation, is that 11:50:02 6 what you're saying? A You sand do it just using your liquid samples, astarting with SPLP for posliny litter and carrying 11:50:08 11 it all the way through edge of field, groundwater, 22 surface water. 23 Q Is your testimony that Dr. Ohen did not 24 perform that analysis? 25 A 1 Pon ever seen a scores plot for that. 26 Q Olay. 27 A In my multimedia analysis, the poultry litter 28 sumples look completely different than the surface 29 water samples. They don't - they den't look as of 29 there's any relationship at all. 21 11:50:12 22 chemical process that may be going on? 23 A 1 Think the processes are dultion and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 26 no vidence of any effect from poultry litter. 27 MS, COLLINS: Page 30, air. 28 A 1 Think the processes are distincted in the commonment. 29 Department of the process that have be going on? 20 A 1 Think the processes are dultion and 21 deposition. Whatever signal might be there is being 22 masked by a native soil signal by the way chemicals 29 masked by a native soil signal by the way chemicals 20 (Q (By Mr. Page) Any thoughty waster 21 partition in water bodies, it just — there's just 22 no ovidence of any effect from poultry litter. 23 Q Is with the processes are dultion and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 26 masked by an arive soil signal by the way chemicals 27 MS, COLLINS: Object to form. 28 A 1 Think the brocesses are dultion and 29 of the three of the commonment. 29 A 1 Think the beau cover of the same issues you 29 the different chemicals are transported in the 29 way the different chemicals are transported in the 29 cover the property of the property sing the original samples			1	
2 calculation. But that's not the only way to do it. 3 You could do a — 4 Q Arryou talking about — let me just interrupt 5 for a second, a multimedia PCA calculation, is that 11:50:02 5 what you're saying? 7 A Yes, as I did. 8 Q Olay, be there any — okay. Anything else? 9 A You can do it just using your liquid samples. 10 satring with SPLP for poulty liter and carrying 11:50:08 11 ist all the way through edge of field, groundwater, 12 surface water. 13 Q is your testimony that Dr. Ohen did not perform that analysis? 14 A nor my multimedia analysis. 15 A Pose were seen a socra plot for that. 11:50:14 16 Q Okay. 17 A In my multimedia analysis, the poultry litter and surples. They don't toka sif there's any relationship at all. 11:50:22 19 Q Can you — can you account for that by some chemical precess that may be going on? 23 A I lithic the processes are dilution and deposition. Multivore signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 2 masked by a native soil signal by the way chemicals 11:51:14 2 you would have in the IRW with poultry waste? 2 MS. COLLINS: Object to form. 3 Q Isn't it true, sir, that the same issues you had with chemical transformations of PAIs when you did your PCA analysis there would be similar issues 11:51:14 2 you would have in the IRW with poultry waste? 3 MS. COLLINS: Object to form. 4 A I think the issue you're referring to is the way the different chemicals are transported in the expert of the field unoff samples? 4 A Fee, thank you. 1— in both cases there are untrients. 5 Q What Page y Yes, sir. 6 A Pon tuntients, but I now other people at text and the result in the edge of field samples. 11:55:08 6 United for look any different than the edge of field samples. They don't new your service with the same issues you had with chemical transformations of PAIs when you did your PCA analysis there would be similar issues 11:51:14 6 you would have in the IRW with poultry waste? 1 MS. COLLINS: Object to form. 10 Q Whr Page y Yes, sir. 11 A And my conc	1	effectively. I think you've got to do a multimedia	1	sure I could come up with many more.
3 MS. COLLINS: Page 30, sir. 4 Q Are you talking about – let me just interrupt 5 for a second, a multimedia PCA calculation, is that 11:50:82 6 what you're saying? 7 A Yes, as 1 did. 8 Q Okay, be there any – okay. Anything cle? 9 A You can do it just using your liquid samples, starting with SPLP for poslity liter and carrying 11:50:08 10 starting with SPLP for poslity liter and carrying 11:50:08 11 it all the way through edge of field, groundwater, surface water. 12 surface water. 13 Q Is your testimony that Dr. Olsen did not perform that that analysis? 14 A Penever seen a secores plot for that. 11:50:14 15 A Penever seen a secores plot for that. 11:50:14 16 Q Okay. 17 A In my multimedia analysis, the poultry liter and the surface supples look completely different than the surface water samples. They don't – they don't look as if supples look completely different than the surface supples of supples supples of the surface supples of supples supples of the surface supples of supples	1	, ,	2	Q What were the chemicals of concern there?
4 A Yes, thank you. 1.—in both cases there are for a second, a multimedia PCA calculation, is that 11:50:02 what you're saying? 7 A Yes, as 1 did. 8 Q Okay, be there any —okay. Anything else? 9 A You can do it just using your liquid samples, starting with SPLP for poultry litter and carrying 11:50:08 11:5	ı	• •	3	MS. COLLINS: Page 30, sir.
5 for a second, a multimedia PCA calculation, is that 11:50:02 6 what you're sayring? 7 A Yea, as I did. 8 Q Okay, Is there any — okay. Anything che? 9 A You can do it just using your liquid samples, starting with SPLP for poultry litter and carrying 11:50:08 10 starting with SPLP for poultry litter and carrying 11:50:08 11 sit all the way through edge of field, groundwater, 12 surface water. 12 surface water. 13 Q Is your testimony that Dr. Olsen did not 15 A Pen never seen a scores plot for that. 11:50:14 15 A Pen never seen a scores plot for that. 11:50:14 15 A Pen never seen a scores plot for that. 11:50:14 15 A Pen never seen a scores plot for that. 11:50:14 15 Samples fook completely different than the surface 16 water samples. They don't — they don't look as if 17 water samples. They don't — they don't look as if 18 samples fook completely different than the surface 19 water samples. They don't — they don't look as if 19 water samples. They don't — they don't look as if 10 Q Can you — can you account for that by some 10 Q Can you — can you account for that by some 11 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it just — there's just 10 partition in water bodies, it jus	I		4	
6 What you're saying? 7 A Yes, as I did. 9 Q Okay, is there any — okay. Anything else? 9 A You can do it just using your liquid samples, satraing with SPLP for poulty litter and samples in all the way through edge of field, groundwater, 11 is all the way through edge of field, groundwater, 12 surface water. 13 Q Is your testimony that Dr. Olsen did not 14 perform that analysis? 14 pareform that analysis? 15 A I hen way score a scores plot for that. 16 Q Okay. 16 A In my multimedia analysis, the edge of field samples from pastures with cattle but no poultry litter samples look completely different than the surface water samples. They don't — they don't look as if there's any relationship at all. 11 is samples look completely different than the surface water samples. They don't — they don't look as if there's any relationship at all. 11 is 1150:22 10 Q Can you — can you account for that by some chemical process that may be gling on? 24 deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 10 Q In it true, sir, that the same issues you had with chemical transformations of PAHs when you old your PCA analysis there would be similar issues 11:51:14 2 no evidence of any effect from poultry litter. 3 Q (By Mr. Page) Yes, sir. 10 Q (By Mr. Page) Yes, sir. 11 A Not nutrients, but I know other people at investigation where the contaminants of concern were unteriors. 11:50:40 15 Department of the multimedia PCA 11:52:18 16 Edge of field samples with cattle but no poultry inter. 17 Q Were those on the Pike property, sir, do you recall? 18 A I think the processes are dilution and dependent of the property are not representative of edge of field in the report? 2 A Tish is the kies you your could be samples that are—were collected, from poultry inter. 2 Q (By Mr. Page) Yes, sir. 2 A And my conclusion from that is that to the extending to ity to identify sources with because the cardior of the different chemicals. Shouldri have applied PCA analysis that you're suggestin		• •	3	· · · · · ·
A Yes, as I did. Q Okay, It was trained with SPLP for poultry litter and carrying 11:50:08 11:50:08 11:50:08 12:50:08 1	I		8	
8 Q Okay. Is there any – okay. Anything clie? 9 A You can do it just using your liquid samples, 11 ist all the way through edge of field, groundwater, 12 surface water. 13 Q Is your testimony that Dr. Olsen did not 14 perform that analysis? 15 A Pen ever seen a score plot for that. 11:50:14 16 Q Okay. 17 A In my multimedia analysis, the poultry litter 18 samples look completely different than the surface 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 there's any relationship at all. 11:50:22 10 Q Can you – can you account for that by some 19 chemical process that may be geing on? 20 a A I think the processes are dilution and 21 deposition. Whatever signal might be there is being 22 masked by a native soil signal by the way chemicals 23 Q Is it it true, sir, that he same issues you 24 had with chemical transformations of PAHs when you 25 did your PCA analysis there swould be similar issues 26 you would have in the IRW with pountry waste? 27 MS. COLLINS: Object to form. 28 A I think the issue you're referring to is the 29 way the different chemicals are transported in the 29 way the different chemicals are transported in the 29 way the different chemicals are transported in the 20 (By Mr. Page) Yes, sir. 21 A And my conclusion from that is that to the 22 extent that's true here, PCA is a very unsuitable 23 technique to ity to identify sources with because 24 the differing transport and the fate of the 25 different chemicals. Shouldn't have applied PCA 26 analysis that you're suggesting? 27 A I think legic you a couple of references in 28 the text to multimedia PCA. 29 Q You provide two; that's correct? 20 A Q You provide two; that's correct? 21 A Q You provide two; that's correct? 22 A I think legic you a couple of references in 23 the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes, I haven't it tiet to be exhaustive. In 11:52:14	1	•	ž.	
A You can do it just using your liquid samples, 10 starting with SPLP for poultry liter and carrying 11 starting with SPLP for poultry liter and carrying 12 surface water. 12 surface water. 13 Q Is your testimony that Dr. Olsen did not 14 perform that analysis? 15 A Pen never seen a scores plot for that. 11:50:14 15 Q Olsy. 16 Q Olsy. 17 A In my multimedia analysis, the edge of field groundwater, surface water samples. They don't – they don't look as if 18 samples look completely different than the surface 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 A Think the processes are dilution and 20 there's any relationship at all. 21 Q Can you – can you account for that by some 22 chemical process that may be going on? 23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 26 no evidence of any effect from poultry liter. 3 Q Isn't it true, sir, that the same issues you 3 did your PCA analysis there would be similar issues 11:50:08 21 a A Ithink the issue you're referring to is the 22 way the different chemicals and transported in the 23 extent that's true here, PCA is a very unsuitable 24 to chinque to try to identify sources with because 25 what's controlling this is not the sources. It's 16 different chemicals. Should't have applied PCA 18 analysis that you're suggesting? 29 A I think lip's you a couple of references in 29 A Yes, I haven't tied to be exhaustive. I'm 11:52:14 20 A Q Very provide two; that's correct? 21 A I think lip's you a couple of references in 23 the text to multimedia PCA 24 Q You provide two; that's correct? 25 A Yes, I haven't tied to be exhaustive. I'm 11:52:14 26 In this the issue pour references for multimedia PCA 27 Exposent have done multimedia for various metals. 28 In:153:32 29 A Think the issue you're referring to is the 29 A Think the issue you're referring to is the 29 A Think the issue you're referring to is the 29 A Think	ı		3	
starting with SPLP for poultry litter and carrying 11:50:08 11 it all the way through edge of field, groundwater, surface water. 12 surface water. 13 Q I your testimony that Dr. Ohen did not 12 perform that analysis? 14 perform that analysis? 15 A I we never seen a scores plot for that. 11:50:14 15 litter don't look any different than the edge of field samples from pastures with cattle but no poultry litter samples look completely different than the surface 17 perform the point of the samples samples look completely different than the surface 18 there's any relationship at all. 11:50:22 10 Q Can you —can you account for that by some 22 chemical process that may be going on? 23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 11:51:03 102 102 102 104 11:55:19 102 104 11:55:19 102 104 11:55:19 104 105 105 105 105 105 105 105 105 105 105	1		8	
11 is all the way through edge of field, groundwater, 12 surface water. 13 Q Is your testimony that Dr. Olsen did not 14 perform that analysis? 15 A Ne never seen a scores plot for that. 11:50:14 16 Q Okay. 17 A In my multimedia analysis, the poultry litter 18 samples look completely different than the surface 19 water samples. They don't – they don't look as if 19 there's amy relationship at all. 11:50:22 20 Q Can you – can you account for that by some 21 chemical process that may be going on? 22 chemical process that may be going on? 23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 26 no evidence of any effect from poultry litter. 27 Q In It it true, sir, that the same issues you 28 had with chemical transformations of PAEIs when you had with chemical transformations of PAEIs when you would have in the IRIW with poultry waste? 29 way the different chemicals are transported in the environment. 20 Q (By Mr. Pags) Yes, sir. 21 A A flunk the issue you're referring to is the way the different chemicals are transported in the environment. 21 A my conclusion from that is that to the environment. 22 A a flunk the issue you're referring to is the way the different chemicals are transported in the environment. 23 A lithink the processes, it is 11:51:23 24 A flunk the issue you're referring to is the way the different chemicals are transported in the environment. 25 what's controlling this is not the sources. It's 11:51:32 26 the differing transport and the fate of the differing transport and the fate of the differing transport and the fate of the differing temper transport and the fate of the differing temper to try to identify sources with because the differing transport and the fate of the differing temper to try to i			}	
surface water. 12 Surface water. 12 Opinions? 12 A In the multimedia analysis, the edge of field samples from pastures with eattle but no poultry litter samples from pastures with eattle but no poultry litter don't look any different than the dege of 11:54:28 litter don't look any different than the dege of 11:54:28 litter don't look any different than the dege of 11:54:28 litter don't look any different than the dege of field samples from pastures with eattle but no poultry litter samples look completely different than the surface law and samples. They don't hete you't hete of the look any different than the dege of field samples sheep opplied. 16 Geld samples here poultry litter has been applied. 17 Q Were those cattle edge of field samples. They control samples? 18 A In him with pound than the field of the samples and the dege of field samples. They could sample she any pound the dege of field samples have been applied. 18 Geld samples have been applied. 19 Q Were those cattle edge of field samples. They could samples? 19 A This may be the ease where one was from a ponded location. 20 So did you actually critique those as not being representative of edge of field in the report? 25 A They are degree of field samples. 26 Geld you actually critique those as not being representative of edge of field in the report? 26 A They are degree of field samples. 27 A They are degree of field in the report? 28 A They are degree of field in the report? 28 A They are degree of field samples. 29 A Think the issue youth early sister on evidence of any effect from poultry litter. 29 A Think the issue youth early sister on evidence of any effect from poultry litter. 29 A They are representative of edge of field in the report? 29 A They are representative of amples have the collected from head of the first of the degree of field samples. 29 A They are representative of amples of from locations where cattle were collected from head of the first of	1		{	
A In the multimedia analysis, the edge of field samples from pastures with cattle but no poultry itter has been applied. A In my multimedia analysis, the edge of field samples from pastures with cattle but no poultry itter has been applied. A In my multimedia analysis, the edge of field samples from pastures with analysis three of the poultry itter has been applied. A In my multimedia analysis, the edge of field samples from pastures with eading of field samples. A In this my multimedia analysis, the edge of field samples from pastures with each go of the field. A In this my multimedia analysis, the edge of field samples from pastures with an edge of field samples are called the open of the samples water samples. They don't — they don't look as if the samples from pastures with each go of field samples, runoff samples? A In this my multimedia analysis, the edge of field samples from pastures with the edge of field samples are called by an extually edge of field samples, runoff samples? A In this my multimedia analysis, the edge of field samples from pastures with an edge of field samples. A In this my multimedia analysis, the edge of field samples from pastures with the edge of field samples. A In this my multimedia analysis, the edge of field samples from pastures with an edge of field samples. A In this my multimedia analysis, the edge of field samples from pastures with an edge of field samples. A In this my my be different than the edge of field samples. A In this my be defacted that the edge of field samples. A In this my my be defacted that he edge of field samples. A In this my be defacted that he edge of field samples. A In this my be the case where one of the samples returnly inter. A In this my be the case where one of the samples returnly inter that been applied. A In this my be the case where one of the samples returnly inter that been applied. A In this my be the case where one of the samples? A In this my be the case where one of the samples? A This my be the case where one of	1		ş	
partition in water bodies, it just — there's just no evidence of any effect from poultry litter. Q Isn't it true, sir, that the same issues you had with chemical transformations of PAIs when you did your PCA analysis there would be similar issues 11:51:14 you would have in the IRW with poultry waste? A I think the issue you're referring to is the way the different chemicals are transported in the environment. A I think the issue you're referring to is the way the different chemicals. Shouldn't have applied PCA analysis that you're suggesting? A And my conclusion from that is that to the exitating to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA a Pour revent and the stope of the text to multimedia PCA a Pour provide twey that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 your own investigation as to sources of bacteria in 11:57:08 samples from pastures with cattle but no poultry litter to field samples where poultry litter the lided analysis to the analysis to the analysis to the sproblem. I partition in water bodies, it just — there's just no evidence of any effect from poultry litter. Q I so it it true, sir, that the same issues you had with chemical transformations of PAIs when you did your PCA analysis there would be similar issues 11:51:14 you would have in the IRW with poultry waste? M SC OLLINS: Object to form. A I think the issue you're referring to is the way the different chemicals are transported in the environment. A One of them would be — well, they both probably are, because what that ponded water representative of runoff. A One of them would be — well, they both probably are, because what that ponded water representative of runoff. A Coll.INS: Object to form. A One of them would be — well, they both probably are, because what that ponded water representative of runoff. A Coll.INS: Object to form. A I think the give you a couple of references in the text to multimedia PCA. Q You provide twe, tha	l		3	•
15 A I've never seen a scores plot for that. 11:50:14 16 Q Okay. A In my multimedia analysis, the poultry litter samples look completely different than the surface water samples. They don't — they don't look as if there's amy relationship at all. 11:50:22 20 Can you — can you account for that by some 21 Q Can you — can you account for that by some 22 chemical process that may be goling on? 23 A I think the processes are dilution and deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 11:51:03 26 masked by a native soil signal by the way chemicals 11:51:03 27 masked by a native soil signal by the way chemicals 11:51:03 28 masked by a native bodies, it just — there's just 29 no evidence of any effect from poultry litter. 30 Q Isn't it true, sir, that the same issues you 40 had with chemical transformations of PAHs when you 41 do your PCA analysis there would be similar issues 41:51:14 42 you would have in the IRW with poultry waste? 43 A I think the issue you're referring to is the 44 way the different than the surface 45 way the different than the surface 46 you would have in the IRW with poultry waste? 47 A And my conclusion from that is that to the 48 extent that's true here, PCA is a very unsuitable 49 technique to try to identify sources with because 40 (By Mr. Page) Yes, sir. 41 Q (By Mr. Page) Yes, sir. 42 A And my conclusion from that is that to the 43 catent that's true here, PCA is a very unsuitable 44 technique to try to identify sources with because 45 what's controlling this is not the sources. It's 11:51:32 46 the differing transport and the fate of the 47 differing transport and the fate of the 48 analysis to this problem. 49 Q Oke than your work in this particular case, 49 Can you provide any references for multimedia PCA 40 You provide twe, that's correct? 41 Link we've covered everything. 42 A Think we've covered everything. 43 A They are representative of samples that are— 44 very the way the different than the edge of field annihe active			8	• • •
16 Q Okay. 17 A In my multimedia analysis, the poultry litter 18 samples look completely different than the surface 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 19 water samples. They don't – they don't look as if 10 water samples. They don't – they don't look as if 10 water samples. They don't – they don't look as if 10 water samples. They don't – they don't look as if 10 water samples. They don't – they don't look as if 11 partitionship at all. 11:50:22 20 was actually edge of field samples value in the edge of field samples. 22 a ponded location. 23 So did you actually critique those as not be being representative of edge of field in the report? 25 A I believe I did. 11:55:08 26 So did you actually critique those as not being representative of edge of field in the report? 26 A I believe I did. 11:55:19 10 Q Were those cattle edge of field samples? 28 A I believe I did. 11:55:09 29 So did you actually critique those as not being representative of edge of field in the report? 29 A I believe I did. 20 Q Were those on the Pike property, sir, do you recall? 20 Q Were those on the Pike property sir, do you recall? 21 A I think the issue you're referring to is the way the different chemicals are transported in the environment. 21 A I think the sisue you're referring to is the way the different chemicals are transported in the environment. 22 A And my conclusion from that is that to the environment. 23 Q (By Mr. Page) Yes, sir. 24 A And my conclusion from that is that to the edge of field and the case where one of the samples actually dege	I	•	3	• • •
A In my multimedia analysis, the poultry litter samples look completely different than the surface there's any relationship at all. 11:50:22 20 Can you can you account for that by some chemical process that may be going on? 21 A I think the processes are dilution and deposition. Whatever signal might be there is being 22 masked by a native soil signal by the way chemicals 23 masked by a native soil signal by the way chemicals 24 deposition in water bodies, it just there's just 25 no evidence of any effect from poultry litter. 26 Q Isn't it rue, sir, that the same issues you 4 had with chemical transformations of PAHs when you 4 did your PCA analysis there would be similar issues 4 A I think the issue you're referring to is the 5 way the different chemicals are transported in the 6 emironment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 22 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 14 technique to try to identify sources with because 15 what's controlling this is not the sources. It's 16 what's controlling this is not the sources. It's 17 defired themicals. Shouldn't have applied PCA 18 analysis that you're suggesting? 29 A I think le give you a couple of references in 20 C provided the complex of the probability of the different chemicals and the fate of the 21 different chemicals. Shouldn't have applied PCA 22 analysis that you're suggesting? 23 A I think le give you a couple of references in 24 A This may be the case where one of the samples was actually not at the edge of field and the other one was from a ponded location. 29 A T bis may be the case were any be the case was actually not at the edge of the field, but 11:55:08 29 A J think the processes are dilution and deposition in the report? 20 B of doyou actually critique those as not being representative of edge of field in the report? 29 A Yes, they are. 20 C Bot't true, sir, that the same issues you 29 A T is may be the case was actually not at the edge of the field, and the other one was from a p		A I've never seen a scores plot for that. 11:50:14	5	
18 samples look completely different than the surface water samples. They don't - they don't look as if there's any relationship at all. 11:50:22 20 Can you - can you account for that by some chemical process that may be going on? 22 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 10 2 10.02 11:55:19 10.04 11:55:19 10.04 11:55:19 10.04 11:55:19 10.04 11:55:19 10.04 11:55:19 10.04 11:55:19 10.04 11:55:24 11:55:24 10.04 11:55:24 10.04 11:55:24 11:55:24 10.04 11:55:24	16	Q Okay.	§ .	• • • • • • • • • • • • • • • • • • • •
19 water samples. They don't - they don't look as if there's any relationship at all. 1150:22 22 Q Can you - can you account for that by some chemical process that may be going on? 23 A I think the processes are dilution and deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just - there's just no evidence of any effect from poultry litter. 3 Q Isn't it true, sir, that the same issues you had with chemical transformations of PAHs when you did your PCA analysis there would be similar issues 11:51:14 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the way the different chemicals are transported in the environment. 11:51:23 1Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 the differing transport and the fate of the different chemicals. Shouldn't have applied PCA analysis that you're suggesting? 2A I think I give you a couple of references in the text to multimedia PCA 11:52:08 2 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 2 In this may be the case where one of the samples was actually not at the edge of field in the other one was from a ponded location. 2 Q So did you actually critique those as not be legic of field in the report? 2 A I believe I did. 11:55:19 2 A Yes, they are. 4 Q Were those on the Pike property, sir, do you recall? 5 A Yes, they are. 4 Q Were those on the Pike property, sir, do you recall? 5 A Yes, they are. 4 Q Were those on the Pike property, sir, do you recall? 5 A Yes, they are. 4 Q Were those on the Pike property, sir, do you recall? 5 A Yes, they are. 4 Q Were those on the Pike property, sir, do you uncelled the opport of the field, and the other one was from a ponded location. 2 Q Were those on the Pike property. 5	17	A In my multimedia analysis, the poultry litter	17	Q Were those cattle edge of field samples
20 there's any relationship at all. 21 Q Can you - can you account for that by some 22 chemical process that may be going on? 23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just - there's just no evidence of any effect from poultry litter. 3 Q Isn't it true, sir, that the same issues you had with chemical transformations of PAHs when you did your PCA analysis there would be similar issues 11:51:14 you would have in the IRW with poultry waste? 4 A I think the issue you're referring to is the way the different chemicals. Shouldn't have applied PCA analysis to this problem. 4 A And my conclusion from that is that to the technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 the differing transport and the fate of the differing transport and the fate of the analysis to this problem. 4 Q Other than your work in this particular case, can you provide any references for multimedia PCA analysis that you're suggesting? 5 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 the text to multimedia PCA a Yes. I haven't tried to be exhaustive. I'm 11:52:14 6 the text to multimedia PCA a Ye	18	samples look completely different than the surface	18	actually edge of field samples, runoff samples?
21 Q Can you can you account for that by some chemical process that may be going on? 22 A I think the processes are dilution and deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 25 masked by a native soil signal by the way chemicals 11:51:03 26	19	water samples. They don't they don't look as if	19	A This may be the case where one of the samples
22 chemical process that may be going on? 23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being 25 masked by a native soil signal by the way chemicals 26 no evidence of any effect from poultry litter. 27 Q Isn't it true, sir, that the same issues you 28 had with chemical transformations of PAHs when you 29 did your PCA analysis there would be similar issues 30 Lin't it true, sir, that the same issues you 30 Had with chemical transformations of PAHs when you 31 did your PCA analysis there would be similar issues 32 Ms. COLLINS: Object to form. 33 A Yes, they are. 44 Yes, they are. 45 Gedge of field in the report? 46 A Yes, they are. 46 You would have in the IRW with poultry waste? 47 Ms. COLLINS: Object to form. 48 A I think the issue you're referring to is the 49 way the different chemicals are transported in the 410 cenvironment. 411:51:23 412 Q (By Mr. Page) Yes, sir. 413 A A my conclusion from that is that to the 414 etechnique to try to identify sources with because 415 what's controlling this is not the sources. It's 11:51:32 416 the differing transport and the fate of the 417 different chemicals. Shouldn't have applied PCA 418 analysis to this problem. 419 Q Other than your work in this particular case, 420 can you provide any references for multimedia PCA 41 think we've covered everything. 42 A I think we've covered everything. 43 A One of them would be — well, they both 44 probably are, because what that ponded water 45 represents is remnants of runoff. 46 Pare you ware of any information that 47 indicates that those samples have been impacted by 48 poultry contamination? 49 Q Other than your work in this particular case, 49 C You provide two; that's correct? 40 Q You provide two; that's correct? 41 U your own investigation as to sources of bacteria in 11:57:03	20	there's any relationship at all. 11:50:22	20	was actually not at the edge of the field, but 11:55:08
23 A I think the processes are dilution and 24 deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just — there's just 2 no evidence of any effect from poultry litter. 3 Q Isn't it rue, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 11:51:14 5 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable technique to try to identify sources with because 15 what's controlling this is not the sources. It's 11:51:32 15 the different chemicals. Shouldn't have applied PCA analysis to this problem. 19 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 21 the text to multimedia PCA 11:52:08 22 A I think give you a couple of references in the text to multimedia PCA 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 5 your own investigation as to sources of bacteria in 11:57:03 your own investigation as to sources of bacteria in 11:57:03 your own investigation as to sources of bacteria in 11:57:03	21	Q Can you can you account for that by some	21	upstream from the field, and the other one was from
deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just — there's just 1 convidence of any effect from poultry litter. 3 Q Isn't it rue, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 11:51:14 5 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 6 A I think the issue you're referring to is the way the different chemicals are transported in the environment. 11:51:23 12 A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 15 the different chemicals. Shouldn't have applied PCA analysis to this problem. 19 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 20 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25	22	chemical process that may be going on?	22	a ponded location.
deposition. Whatever signal might be there is being masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just — there's just 1 no evidence of any effect from poultry litter. 3 Q Isn't it rue, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 11:51:14 5 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 15 technique to try to identify sources with because 15 what's controlling this is not the sources. It's 11:51:32 15 the differing transport and the fate of the 17 different chemicals. Shouldn't have applied PCA 11:52:08 21 analysis to this problem. 19 Q Other than your work in this particular case, 21 analysis that you're suggesting? 22 A I think give you a couple of references in the text to multimedia PCA 11:52:14 25 A lobieve I did. 11:55:19 11	23	A I think the processes are dilution and	23	Q So did you actually critique those as not
25 masked by a native soil signal by the way chemicals 11:51:03 102 1 partition in water bodies, it just there's just 1	24	•	24	being representative of edge of field in the report?
1 partition in water bodies, it just — there's just 2 no evidence of any effect from poultry litter. 3 Q Isn't it true, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 11 Q Were those on the Pike property, sir, do you 2 recall? A T Yes, they are. Q So is it still your opinion that those samples from the Pike property are not representative of 11:55:24 edge of field runoff samples? A T they are representative of samples that are — were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 12 Q Are they representative of runoff samples, 3 sir? 3 A One of them would be — well, they both probably are, because what that ponded water propably are, because	1	•	25	•
partition in water bodies, it just there's just no evidence of any effect from poultry litter. Q Isn't it true, sir, that the same issues you had with chemical transformations of PAHs when you did your PCA analysis there would be similar issues did your PCA analysis there would be similar issues MS. COLLINS: Object to form. A I think the issue you're referring to is the way the different chemicals are transported in the environment. Q (By Mr. Page) Yes, sir. A And my conclusion from that is that to the cextent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's what's controlling this is not the sources. It's different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA. Linking live you a couple of references in the text to multimedia PCA. A Yes, they are. Q So is it still your opinion that those samples from the Pike property, sir, do you recall? A Yes, they are. Q A Yes, they are. Q A Yes, they are. Q A Tee, they are: log of field runoff samples? A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 Q Are they representative of runoff samples, sir? A One of them would be well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 Q Are you aware of any information that indicates that those samples have been impacted by poultry contamination? MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think give you a couple of references in the text to multimedia PCA. 20 Q You provide two; that's correct? A I think we've covered everything. 21 A I think give you a couple of references in the text to multimedia PCA. 22 Q You provide two; that's correct? A I think give you a couple of references in y	"			104
2 no evidence of any effect from poultry litter. 3 Q Isn't it true, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 6 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 14 technique to try to identify sources with because 15 what's controlling this is not the sources. It's 11:51:32 16 the differing transport and the fate of the 17 differing transport and the fate of the 18 analysis to this problem. 19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 21 a I think I give you a couple of references in 22 the text to multimedia PCA 23 Q You provide two; that's correct? 24 Q You provide two; that's correct? 25 A Yes, they are. 4 Q So is it still your opinion that those samples 5 from heat still your opinion that those samples 6 dege of field runoff samples? 7 A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:55:03 12 Q are they representative of runoff samples, 13 A Yes, they are. 4 Q So is it still your opinion that those samples 6 dege of field runoff samples? 7 A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 12 Q are they representative of runoff samples, 12 sir? 13 A One of them would be well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 14 poultry contamination? 15 Q (By Mr. Page) Anything else, sir? 16 Q (By Mr. Page) Anything else, sir? 17 Q (By Mr. Page) Anything else, sir? 18 Q (By Mr. Page) Anything else, s	ļ		ļ	101
2 no evidence of any effect from poultry litter. 3 Q Isn't it true, sir, that the same issues you 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 6 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 14 technique to try to identify sources with because 15 what's controlling this is not the sources. It's 11:51:32 16 the differing transport and the fate of the 17 differing transport and the fate of the 18 analysis to this problem. 19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 21 a I think I give you a couple of references in 22 the text to multimedia PCA 23 Q You provide two; that's correct? 24 Q You provide two; that's correct? 25 A Yes, they are. 4 Q So is it still your opinion that those samples 5 from heat still your opinion that those samples 6 dege of field runoff samples? 7 A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:55:03 12 Q are they representative of runoff samples, 13 A Yes, they are. 4 Q So is it still your opinion that those samples 6 dege of field runoff samples? 7 A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 12 Q are they representative of runoff samples, 12 sir? 13 A One of them would be well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 14 poultry contamination? 15 Q (By Mr. Page) Anything else, sir? 16 Q (By Mr. Page) Anything else, sir? 17 Q (By Mr. Page) Anything else, sir? 18 Q (By Mr. Page) Anything else, s	,	and the second of the state of the second of the second	1	O Ware those on the Piles property sin do you
3 A Yes, they are. 4 had with chemical transformations of PAHs when you 5 did your PCA analysis there would be similar issues 11:51:14 6 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 15 the differing transport and the fate of the differing transport and the fate of the 17 different chemicals. Shouldn't have applied PCA 18 analysis to this problem. 19 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 20 A Yes, they are. 4 Q So is it still your opinion that those samples from the Pike property are not representative of 11:55:24 edge of field runoff samples? 7 A They are representative of samples that are — were collected, liquid samples that were collected from locations where cattle were present, but not 10 poultry. 11:56:03 11 Q Are they representative of runoff samples, sir? 12 sir? 13 A One of them would be — well, they both 14 probably are, because what that ponded water 11:56:09 14 probably are, because what that ponded water 11:56:09 15 q Are you aware of any information that 17 indicates that those samples have been impacted by 18 poultry contamination? 18 A Yes, they are. 19 Q Other than your work in this particular case, 20 Q (By Mr. Page) Anything else, sir? 20 Q You provide two; that's correct? 21 Q You provide two; that's correct? 22 A I think Ve've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03		•	ş	
4 had with chemical transformations of PAHs when you did your PCA analysis there would be similar issues 11:51:14 5 you would have in the IRW with poultry waste? 7 MS. COLLINS: Object to form. 8 A I think the issue you're referring to is the way the different chemicals are transported in the environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 15 the differing transport and the fate of the analysis to this problem. 19 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 20 A I think I give you a couple of references in the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 11:52:14 11:57:03 4 Q So is it still your opinion that those samples from the Pike property are not representative of representative of representative of samples that are—were collected, liquid samples that are—were collected from locations where cattle were present, but not poultry. 11:56:03 10 Q Are they representative of samples that are—were collected from locations where cattle were present, but not poultry. 11:56:03 11 Q Are they representative of runoff samples, sir? 22 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 23 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 24 A T think I give you a couple of PCA 11:52:08 25 A I think I give you a couple of references in the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 25 25 25 25 25 25 25 25 25 25 25 25			3	
did your PCA analysis there would be similar issues 11:51:14 you would have in the IRW with poultry waste? MS. COLLINS: Object to form. A I think the issue you're referring to is the way the different chemicals are transported in the environment. 11:51:23 Q (By Mr. Page) Yes, sir. A And my conclusion from that is that to the textent that's true here, PCA is a very unsuitable the differing transport and the fate of the different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA. A I think I give you a couple of references in the text to multimedia PCA. A Yes. I haven't tried to be exhaustive. I'm 11:52:14 b from the Pike property are not representative of list of the Pike property are not representative of samples and representative of samples that are—were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 A And my conclusion from that is that to the poultry. 11:56:03 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think I give you a couple of references in the text to multimedia PCA. 20 Q You provide two; that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 b from the Pike property are not representative of samples that are—were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 A And my conclusion shere cattle were present, but not poultry. 11:56:03 A One of them would be — well, they both probably are, because what that ponded water representative of nunoff samples. A One of them would be — well, they both probably are, because wh			3	
dege of field runoff samples? MS. COLLINS: Object to form. A I think the issue you're referring to is the way the different chemicals are transported in the environment. 11:51:23 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 15 what's controlling this is not the sources. It's 11:51:32 16 different chemicals. Shouldn't have applied PCA analysis to this problem. 19 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 21 a I think I give you a couple of references in the text to multimedia PCA. 22 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 6 edge of field runoff samples? 7 A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 10 poultry. 11:56:03 11 Q Are they representative of runoff samples, sir? A One of them would be well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 14 probably are, because what that ponded water represents is remnants of runoff. 11:56:09 15 Q Are you aware of any information that indicates that those samples have been impacted by poultry contamination? 18 poultry contamination? 29 A Not as I sit here, no. 11:56:16 20 Q (By Mr. Page) Anything else, sir? 21 A I think We've covered everything. 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03			5	
MS. COLLINS: Object to form. A I think the issue you're referring to is the way the different chemicals are transported in the normorment. 11:51:23 10 poultry. 11:56:03 11 Q (By Mr. Page) Yes, sir. 12 A And my conclusion from that is that to the a extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's the different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 A I think I give you a couple of references in the text to multimedia PCA. A They are representative of samples that are were collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 A One of them would be well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A Are you aware of any information that indicates that those samples have been impacted by poultry contamination? MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think we've covered everything. Q Vou provide two; that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 11:52:14 12 A They are representative of samples that were collected, liquid samples that were collected. A One of them would be - well, they both probably are, because what that ponded water representative of runoff. A One of them would be - well, they both probably are, because what that ponded water representative of samples. A Page of the differing t	t .	•	1	
8 A I think the issue you're referring to is the 9 way the different chemicals are transported in the 10 environment. 11:51:23 10 11 Q (By Mr. Page) Yes, sir. 11 Q A And my conclusion from that is that to the 13 extent that's true here, PCA is a very unsuitable 14 technique to try to identify sources with because 15 what's controlling this is not the sources. It's 11:51:32 15 represents is remnants of runoff. 11:56:09 16 the differing transport and the fate of the 17 different chemicals. Shouldn't have applied PCA 18 analysis to this problem. 19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 11:52:08 21 analysis that you're suggesting? 22 A I think I give you a couple of references in 23 the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 swere collected, liquid samples that were collected from locations where cattle were present, but not poultry. 11:56:03 10 Q Are they representative of runoff samples, sir? 11 Q Are they representative of runoff samples, sir? 12 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 14 probably are, because what that ponded water represents is remnants of runoff. 11:56:09 15 Q Are you aware of any information that indicates that those samples have been impacted by poultry contamination? 18 poultry contamination? 19 MS. COLLINS: Object to form. 20 (By Mr. Page) Anything else, sir? 21 Q (By Mr. Page) Anything else, sir? 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	1	you would have in the IRW with poultry waste?	3	· ·
way the different chemicals are transported in the environment. 11:51:23 10 Q (By Mr. Page) Yes, sir. 11 A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 15 what's controlling transport and the fate of the different chemicals. Shouldn't have applied PCA analysis to this problem. 18 Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 11 Q Are they representative of runoff samples, 12 sir? 13 A One of them would be — well, they both probably are, because what that ponded water 15 represents is remnants of runoff. 11:56:09 16 Q Are you aware of any information that 17 indicates that those samples have been impacted by poultry contamination? 18 Doubtry Contamination? 19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 11:52:08 21 analysis that you're suggesting? 22 A I think I give you a couple of references in 23 the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03	7	MS. COLLINS: Object to form.	į.	• •
environment. 11:51:23	8	A I think the issue you're referring to is the	8	were collected, liquid samples that were collected
Q (By Mr. Page) Yes, sir. A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 the different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 analysis that you're suggesting? A I think I give you a couple of references in the text to multimedia PCA. Yes, I haven't tried to be exhaustive. I'm 11:52:14 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A No are you aware of any information that indicates that those samples have been impacted by poultry contamination? MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think we've covered everything. A Unit to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	9	way the different chemicals are transported in the	9	from locations where cattle were present, but not
A And my conclusion from that is that to the extent that's true here, PCA is a very unsuitable technique to try to identify sources with because the differing transport and the fate of the different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA analysis that you're suggesting? A I think I give you a couple of references in the text to multimedia PCA. A Yes. I haven't tried to be exhaustive. I'm 11:52:14 12 sir? 13 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 14 probably are, because what that ponded water 15 represents is remnants of runoff. 16 Q Are you aware of any information that 17 indicates that those samples have been impacted by poultry contamination? 18 MS. COLLINS: Object to form. 20 A Not as I sit here, no. 11:56:16 21 Q (By Mr. Page) Anything else, sir? 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	10	environment. 11:51:23	10	poultry. 11:56:03
extent that's true here, PCA is a very unsuitable technique to try to identify sources with because what's controlling this is not the sources. It's 11:51:32 the different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 analysis that you're suggesting? A I think I give you a couple of references in the text to multimedia PCA. Q You provide two; that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 A One of them would be — well, they both probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A Are you aware of any information that indicates that those samples have been impacted by poultry contamination? MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think we've covered everything. A I think we've covered everything. A I think we've covered everything. A I think use sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	11	Q (By Mr. Page) Yes, sir.	11	Q Are they representative of runoff samples,
technique to try to identify sources with because that technique to try to identify sources. It's 11:51:32 15	12	A And my conclusion from that is that to the	12	sir?
technique to try to identify sources with because has been been impacted by marks controlling this is not the sources. It's 11:51:32 he different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 A I think I give you a couple of references in the text to multimedia PCA. Yes. I haven't tried to be exhaustive. I'm 11:52:14 he different chemicals in the sources. It's 11:51:32 he probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A Are you aware of any information that indicates that those samples have been impacted by poultry contamination? MS. COLLINS: Object to form. A Not as I sit here, no. 11:56:16 Q (By Mr. Page) Anything else, sir? A I think we've covered everything. A I think we've covered everything. A I think we've covered everything. A Ves. I haven't tried to be exhaustive. I'm 11:52:14 he probably are, because what that ponded water represents is remnants of runoff. 11:56:09 A re you aware of any information that indicates that those samples have been impacted by poultry contamination? A Not as I sit here, no. 11:56:16 A I think we've covered everything. A Usuar to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	13	extent that's true here, PCA is a very unsuitable	13	A One of them would be - well, they both
what's controlling this is not the sources. It's 11:51:32 15 represents is remnants of runoff. 11:56:09 the differing transport and the fate of the 16 Q Are you aware of any information that 17 different chemicals. Shouldn't have applied PCA 18 analysis to this problem. 18 poultry contamination? Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 11:52:08 21 analysis that you're suggesting? 22 A I think I give you a couple of references in 23 the text to multimedia PCA. 23 Q I want to make sure I understand the scope of 24 You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03	14		14	probably are, because what that ponded water
the differing transport and the fate of the different chemicals. Shouldn't have applied PCA analysis to this problem. Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 A I think I give you a couple of references in the text to multimedia PCA. O You provide two; that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 16 Q Are you aware of any information that indicates that those samples have been impacted by poultry contamination? 18 poultry contamination? 19 MS. COLLINS: Object to form. 20 A Not as I sit here, no. 11:56:16 21 Q (By Mr. Page) Anything else, sir? 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03	1	. ,	15	• •
different chemicals. Shouldn't have applied PCA analysis to this problem. Q Other than your work in this particular case, can you provide any references for multimedia PCA 11:52:08 11:52:08 21 analysis that you're suggesting? 22 A I think I give you a couple of references in the text to multimedia PCA. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 27 indicates that those samples have been impacted by poultry contamination? 19 MS. COLLINS: Object to form. 20 A Not as I sit here, no. 11:56:16 21 Q (By Mr. Page) Anything else, sir? 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform 25 your own investigation as to sources of bacteria in 11:57:03		-	16	•
analysis to this problem. 19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 11:52:08 21 analysis that you're suggesting? 22 A I think I give you a couple of references in 23 the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 18 poultry contamination? 19 MS. COLLINS: Object to form. 20 A Not as I sit here, no. 11:56:16 21 Q (By Mr. Page) Anything else, sir? 22 A I think we've covered everything. 23 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform 24 your work in this case, Dr. Murphy. Did you perform 25 your own investigation as to sources of bacteria in 11:57:03			17	•
19 Q Other than your work in this particular case, 20 can you provide any references for multimedia PCA 11:52:08 20 A Not as I sit here, no. 11:56:16 21 analysis that you're suggesting? 21 Q (By Mr. Page) Anything else, sir? 22 A I think I give you a couple of references in 22 A I think we've covered everything. 23 the text to multimedia PCA. 23 Q I want to make sure I understand the scope of 24 Q You provide two; that's correct? 24 your work in this case, Dr. Murphy. Did you perform 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03			8	
can you provide any references for multimedia PCA 11:52:08 20 A Not as I sit here, no. 11:56:16 21 analysis that you're suggesting? 21 Q (By Mr. Page) Anything else, sir? 22 A I think I give you a couple of references in 22 A I think we've covered everything. 23 the text to multimedia PCA. 23 Q I want to make sure I understand the scope of 24 Q You provide two; that's correct? 24 your work in this case, Dr. Murphy. Did you perform 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03	1	· · · · · · · · · · · · · · · · · · ·	8	- ·
analysis that you're suggesting? A I think I give you a couple of references in the text to multimedia PCA. You provide two; that's correct? A Yes. I haven't tried to be exhaustive. I'm 11:52:14 A I think we've covered everything. I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform your own investigation as to sources of bacteria in 11:57:03			3	•
22 A I think I give you a couple of references in 23 the text to multimedia PCA. 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 28 A I think we've covered everything. 29 Q I want to make sure I understand the scope of your work in this case, Dr. Murphy. Did you perform 29 your own investigation as to sources of bacteria in 11:57:03		• •	Į.	•
the text to multimedia PCA. 23 Q I want to make sure I understand the scope of 24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 28 Q I want to make sure I understand the scope of 29 your work in this case, Dr. Murphy. Did you perform 20 your own investigation as to sources of bacteria in 11:57:03	1		3	
24 Q You provide two; that's correct? 25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03		- · · · · · · · · · · · · · · · · · · ·	3	
25 A Yes. I haven't tried to be exhaustive. I'm 11:52:14 25 your own investigation as to sources of bacteria in 11:57:03		_	8	
		•	3	-
103	25		25	•
	1	103		105

27 (Pages 102 to 105)

matter? A Similar subject matter, looking at Dr. Olsen's PCA and did it tell the story in successive towns. Q List your position that that's net part of—shead be candidered part of the considered of the facts or opinions in his includes all of his work in that first phase of the considered materials that we report. MR. PAGE: So that was the additional considered materials that we reprovided? MR. PAGE: So that was the additional considered materials that we reprovided? MR. PAGE: About a weck or two ago? MR. PAGE: So that was the additional considered materials that were provided? MR. PAGE: About a weck or two ago? MR. PAGE: About a weck or two ago? MR. PAGE: About a weck or two ago? A Steve Mudge did. Q (By Mr. Pago) Did anyone review your expert. A No. I asked him at one point could he point me to some multimodia PCA, so I used those as references instead. Q (Were you having a hard time finding multimedia PCA as a They would have either been by phoso or by 02:26:12 A He provided me - yes, he provided me with some comments? A No. I simple? A No. I simple? A No. I simple? A No. I simple? A No. I simple incorporated them into my report. Q Okay. Did you make a record of those comments? A No. I simple incorporated them into my report. Q Okay. Did you make a record of those comments? A No. I simple? A No. I simple? A No. I simple? A No. I simple incorporated them into my report. Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— A Some of them I did, yos. Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— Q Okay. So Dr. Mudge comments be made? Q Ok			?	
2 A Similar subject matter, looking at Dr. Olsen's 3 PCA and did it sell the story is successive towns. 4 Q Is it your position that that's not part of— 5 should be considered part of the considered 6 materials for this work that was done? 7 A No, 1— 8 MS. COLLIN: No, that's not our position. 9 In fact, the second set of considered materials includes all of his work in that first phase of the Oc225:19 11 project related to the facts or opinions in his 12 ultimate report. 12 MR. PAGE: So that was the additional 13 MR. PAGE: So that was the additional 14 considered materials that were provided? 15 MS. COLLINS: Toncect 16 Q (By Mr. Pago) Did anyone review your expert 17 report? 18 Q (By Mr. Pago) Did anyone review your expert 19 A Steve Mudge did. 10 Q (By Mr. Pago) Did anyone review your expert 19 A Steve Mudge did. 10 Q (By Mr. Pago) Did anyone review your expert 19 A Steve Mudge did. 10 Q (By Mr. Pago) Did anyone review your expert 19 A Steve Mudge did. 10 Q (By Mr. Pago) Did anyone review your expert 10 A Steve Mudge did. 11 comments 12 Q (By Mr. Pago) Did anyone review your expert 12 A He provided me—yes, he provided me with 13 some comments. 16 Q (By Mr. Pago) Did anyone review your expert 17 comments 18 Q (By Mr. Pago) Did anyone review your expert 19 PCA examples? 10 A Steve Mudge did. 10 C (By Mr. Pago) Did anyone review your expert 10 A Steve Mudge did. 11 comments 12 usual those as references instead. 12 Q (By J. Unital form), were they verbal or written? 13 A No. I suimply incorporated them into my report. 14 Q Q (By J. Unital form), were they verbal or written? 15 Q So — (22:6212 16 A And the e-mails, if they exist, were turned over. 16 Q Okay. Jou recall what comments he made? 17 A That's all I recall. 18 Q (By as the one who came up with the possibility of sterols — (22:27:105) 19 possibility of sterols — (22:27:105) 10 A Yes, he said, why - why is he doing this analysis based on things that are found in minals, like sterols. 19 Q Okay. Anything else? 20 A Hawas the one who came up with the possibil	1 matter?		1	shows a three-dimensional view of PCA analysis that
3 P.CA and did it rell the story in successive towns. 4 Q Is it your position that that's not part of — 5 should be considered part of the considered 6 materials for this work that was done? 7 A No.1— 8 MS. COLLIN: No, that's not our position. 9 In fact, the second set of considered materials 10 includes all of his work in that first phase of the 11 project rolated to the facts or opinions in his 12 ultimate report. 13 MK. PAGE: So that was the additional 14 considered materials has twee provided? 15 MS. COLLINS: Correct 16 MR. PAGE: So that was the additional 17 message of materials that were provided? 18 Q (By Mr. Pago) Did anyone review your expert 19 report? 19 A Second Modge did. 10 considered materials that week or two ago; 10 A Second Modge did. 10 considered materials that week provided ne with 10 some comments. 11 Q In what form, were they verbal or written? 12 A They would have either been by phone or by 02:26:12 15 A They would have either been by phone or by 02:26:12 16 A A and the e-mails, if they exist, were turned 17 over. 18 Q Olay. Did you make a record of those 18 Q Olay. Did you make a record of those 19 possibly of sterols — 19 Q Diay wereall what comments he made? 20 A The comment about using sterols was his 21 Q Olay. Anything decreated was this 22 analysis based on things that are found in similas, 23 Best sterols. 24 Q Olay. Anything decreated was possible to the did things that are found in similas, 24 Q Olay. Anything else? 25 A That was an example, yes. 26 Q Olay. Anything else? 27 A The was the one who came up with the 28 possibly of sterols — 29 possibly waste form soils with sterols? 29 Q Olay. Anything else? 20 Q Olay. Anything else? 21 A That was an example, yes. 22 A That was an example, yes. 23 A That was an example, yes. 24 Q Olay. Anything else? 25 A The waste one who came up with the 26 Day Olay. Anything else? 27 A The waste one who came up with the 28 possibly waste form soils with sterols? 29 Day Olay. Anything else? 20 Day. Anything else? 21 A The waste one who came up w	l.	lar subject matter, looking at Dr. Olsen's	3	
4 helped explain what PCA was, and I chose not to use what PCA was, and I chose not to use what PCA was, and I chose not to use that PCA was, and I chose not to use what PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was, and I chose not to use that PCA was and I chose not to use that? A No. I and I chose not to use that? A No. I have not, no. A had hat hat we provided? A Sc COLLINS: So that was the additional that in eped that much O2:28:04 in explaining what PCA is. I was a lidal for loll we provided that the ped that much O2:28:17 in my office already that did multimedia PCA, so I within the ped that much O2:28:17 in my office already that did multimedia PCA in my office already that did multimedia PCA in my office already that did multimedia PCA is in my office already that did multimedia PCA is in my office al	1		3	• • •
5 habuted be considered part of the considered 6 materials for this work that was done? 7 A No, 1 8 MS, COLLIN: No, that's not our position. 9 In fact, the second set of considered materials 10 includes all of his work in that first phase of the 11 project related to the fact or opinions in his 12 ultimate report. 12 ultimate report. 13 MR, PAGE: So that was the additional 14 considered materials that were provided? 15 MS, COLLINS: Correct 16 MS, COLLINS: Correct 17 MS, COLLINS: Correct 18 Q (By Mr, PAGE: Both at weck or two ago; 17 MS, COLLINS: That's correct. 19 A Steve Modge did. 10 Q in Wh. Page) Did anyone review your expert 19 report? 20 A Steve Modge did. 21 Q Did he provide you any comments? 22 A He provided me — yes, he provided me with someoments. 24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 26 Did you get — did you ever prepare such a 3-D 27 view? 28 A No. I saked him at one point could he point me to some multimedia PCAs, and he gave me a lead 29 which I didn't follow up. I found — I had papers 20 Q Use was promments? 20 A Steve Modge did. 21 Q I'm going a lead time finding multimedia 22 Q Nay. Did you make a record of those 23 a A That was an example, ves. 24 Q Okay. Did you make a record of those 25 A The sound have either been by phone or by 26 Q Okay. Did you make a record of those 27 over. 28 Q Okay. Did you make a record of those 28 Q Okay. Did you make a record of those 29 and make the revisions pursuant to— 30 Q Okay. Did you was bounded the made? 31 Q Deep you recall what comments he made? 41 Q Deep you recall what comments he made? 42 Q Diay. Did you was bounded the point mat you was bounded and papers 42 Q Okay. And so it was Dr. Mudge who made the 43 position for them I did, yes. 44 Q Did you was bounded the point mands, like seroel. 45 Q Okay. And so it was Dr. Mudge who made the 46 Q Diay. And so it was Dr. Mudge who made the 47 over. 48 Q Okay. Anything else? 49 A That was an example, yes. 40 Q Okay. Anything else? 50 A Yes. 51 Did		•	3	
7 view? MS. COLLIN: No, that's not our position. 9 In fact, the second set of considered materials includes all of his work in that first phase of the 02:25:19 project related to the facts or opinions in his ultimate report. 12 ultimate report. 13 MR. PAGE: So that was the additional considered materials that were provided? 15 MR. COLLINS: Correct 02:25:25 MS. COLLINS: Correct 02:25:25 MS. COLLINS: Correct 02:25:25 MS. COLLINS: That's correct. 16 MR. PAGE: About a week or two age? 17 MS. COLLINS: That's correct. 18 Q (By Mr. Page) Did anyone review your expert report. 19 report? 20 A Steve Mudge did. 02:26:06 20 Q Did he provide you any comments? 21 A He provided me yes, he provided me with some commends which forms were they verbal or written? 22 A They would have either been by phone or by 02:26:12 25 A They would have either been by phone or by 02:26:12 26 A A and the e-mails, if they exist, were turned over. 23 comments? 24 A No, I simply incorporated them into my report. 25 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 26 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 27 Q Polay. That she one who came up with the popular waste from solids, yes. 02:26:27 12 A The comment about using sterols was his comment. 28 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 28 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 29 Q Okay. And so it was Dr. Mudge who made the positive sterols 20 Q Okay. And so it was Dr. Mudge who made the positive sterols 21 Q Okay. And so it was Dr. Mudge who made the positive sterols 22 Q Okay. And so it was Dr. Mudge who made the positive sterols 23 A That was an example, yes. 02:27:18 A That's correct. 02:28:26 A Yes. 02:31:03			5	• •
7 A No, I 8 MS. COLLIN: No, that's not our position. 9 In fact, the second set of considered materials includes all of his work in that first phase of the 02:25:19 project related to the facts or opinions in his ultimate report. 10 includes all of his work in that first phase of the 02:25:19 project related to the facts or opinions in his ultimate report. 11 considered materials that were provided? 12 ultimate report. 13 MR. PAGE: So that was the additional considered materials that were provided? 14 me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:17 in me to some multimedia PCAs, and he gave me a lead which I didn't follow up. 1 found - 1 had papers 02:28:12 in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to some multimedia PCAs of the papers in me to so	6 materials	for this work that was done?	6	O Did you get did you ever prepare such a 3-D
MS. COLLINS: On, that's not our position. In fact, the second set of considered materials includes all of his work in that first phase of the 02:25:19 includes all of his work in that first phase of the 02:25:19 includes all of his work in that first phase of the 02:25:19 includes all of his work in that first phase of the 02:25:19 includes all of his work in that first phase of the 02:25:19 includes all of his work in that first phase of the facts or opinions in his ultimate report. MR. PAGE: So that was the additional considered materials that were provided? MR. PAGE: So that was the additional considered materials that were provided? MR. PAGE: About a week or two ago? MR. Collins: About a week or two ago? MR. Collins: About a week or two ago? MR. Collins: About a we			7	
9	•		8	
10 includes all of his work in that first phase of the 02:25:19 10 A Well, I didn't think that it helped that much 02:28:04 11 in explaining what PCA is ultimate report. 12 Q Okay, Anything else? 13 A No. I asked him at one point could be point ment to some multimedia PCAs, and he gave me a lead which I didn't follow up. I found - I had papers 02:28:17 MR. COLLINS: Correct 02:25:25 15 MR. PAGE: About a week or two ago? 16 MR. COLLINS: That's correct. 17 MR. COLLINS: That's correct. 17 MR. COLLINS: That's correct. 18 Q (By Mr. Page) Did anyone review your expert 19 PCA Farefrence instead. 19 PCA Farefrence instead. 19 PCA Farefrence instead. 19 PCA Farefrence instead 19 PCA Farefrence instead. 19			3	•
11 project related to the facts or opinions in his ultimate report. 12 ultimate report. 13 MR. PAGE: So that was the additional considered materials that were provided? 14 me to some multimedia PCAs, and he gave me a lead which I didn't follow up. I found — I had papers 02:28:17 in my office already that did multimedia PCA, so I me to some multimedia PCAs, and he gave me a lead which I didn't follow up. I found — I had papers 02:28:17 in my office already that did multimedia PCA, so I used those as references instead. 19 Q By Mr. Page) Did anyone review your expert. 19 report? 20 A Steve Mudge did. 21 Q Did he provide you any comments. 22 A He provided me — yes, he provided me with some comments. 23 some comments. 24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12 comments? 26 A A No, I simply incorporated them into my report. 27 Q Okay. Did you make a record of those comments? 28 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— 29 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— 20 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— 21 Q Dyou recall what comments he made? 22 A The comment about using sterols was his comment. 23 Comment. 24 Q I was the one who came up with the possibility of sterols — 02:27:05 and make the revisions pursuant to— 25 A The, be aid, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things tha			1	- ,
ultimate report. MR. PAGE: So that was the additional considered materials that were provided? MS. COLLINS: Correct 02:25:25 MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. MS. COLLINS: That's correct. MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. MR. PAGE: About a week or two ago? A Weer you having a hard time finding multimedia PCA examples? A No, but, you know, I thought since I had 02:28:26 a No. but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thought since I had 02:28:26 A No, but, you know, I thou		<u>-</u>	3	•
MR. PAGE: So that was the additional considered materials that were provided? MR. PAGE: About a week or two ago? MS. COLLINS: Correct 02:25:25 MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. Q GBy Mr. Pago) Did anyone review your expert 189 PCA examples? A Steve Mudge did. 02:26:06 Q Did he provide you any comments? A He provided me — yes, he provided me with 3 some comments. A He provided me — yes, he provided me with 3 some comments. A They would have either been by phone or by 02:26:12 A They would have either been by phone or by 02:26:12 Q Okay. Pid you make a record of those 3 comments? A No. I asked him at one point could he point me to some multimedia PCA, and he gave me a lead which I didning multimedia PCA, so I in my office already that did multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Were you having a hard time finding multimedia PCA, so I used those as references instead. Q Poday. Pado them. Q Poday and them. Q Poday and make a record of those on them? A No, I asked him at did multimedia PCA, so I used those as references instead. Q Poday and them. Q Poday and make a record of those on them? A The semals between Dr. Mudge and myself: A The comment about using a steroid accept of multimedia PCA? A The semals bet	1	•	3	
considered materials that were provided? MS. COLLINS: Correct MS. COLLINS: Correct MS. COLLINS: That's correct. In my office already that did multimedia PCAs, so I used those as references instead. Q Were you having a hard time finding multimedia PCAs and the find in provided me. A Strew Mudge did. O. 20:26:06 A Per provided me. —yes, he provided me with Some comments. A Per provided me. —yes, he provided me with 23 as one comments. A Per provided me. —yes, he provided me with 24 Q Nay, Indust form; were they verbal or written? A They would have either been by phone or by O2:26:12 D. A That's form; were they verbal or written? A They would have either been by phone or by O2:26:12 D. A That's all I recall. O2:29:03 D. A That's all I recall.		-	1	• • •
15 MS. COLLINS: Correct 02:25:25 15 which I didn't follow up. I found — I had papers 02:28:17 MR. PAGE: About a week or two age? 16 is my office already that idd multimedia PCA, so I used those as references instead. 18 Q (By Mr. Page) Did anyone review your expert 19 report? 19 report? 19 PCA examples? 19 PCA example	l		3	•
16 MR. PAGE: About a week or two ago? MS. COLLINS: That's correct. 17 MS. COLLINS: That's correct. 18 Q MS. Mr. Page) Did anyone review your expert 19 report? 20 A Steve Mudge did. 20 226:06 21 Q Did he provided you any comments? 22 A He provided me yes, he provided me with 23 some comments. 24 Q I methat form; were they verbal or written? 25 A They would have either been by phone or by 26 A They would have either been by phone or by 27 A No., 1 bin you make a record of those 28 C Q Okay. Did you make a record of those 30 comments? 4 A No., 1 simply incorporated them into my report. 5 Q So		•	3	•
MS. COLLINS: That's correct. 18	l		8	•
18 Q Were you having a hard time finding multimedia 19 report? 2 A Sieve Mudge did. 02:26:06 2 Q Did he provide you any comments? 3 some comments. 2 Q In what form; were they verbal or written? 4 A They would have either been by phone or by 02:26:12 5 A No, 1 simply incorporated them into my report. 5 Q So.— 02:26:22 6 A No, 1 simply incorporated them into my report. 6 Q Nay. Did you make a record of those comments? 7 A No, 1 simply incorporated them into my report. 8 Q Okay. Did you make a record of those over. 9 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— 10 A Some of them I did, yes. 02:26:27 21 A The comment about using sterols was his comment. 22 Q Deay. A No, 1 simply incorporated them made? 23 A No, 1 simply incorporated them into my report. 8 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to— 10 A Some of them I did, yes. 02:26:27 11 Q De you recall what comments he made? 12 A The comment about using sterols was his comment. 13 comment. 14 Q He was the one who came up with the possibility of sterols — 02:27:05 15 possibility of sterols — 02:27:05 16 A Yes, he said, why — why is he doing this said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that		-	3	· · · · · · · · · · · · · · · · · · ·
19 report? 20 A Steve Mudge did. 20 Did he provide you any comments? 21 A He provided me — yes, he provided me with some comments. 22 A He provided me — yes, he provided me with some comments. 23 some comments. 24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12 26 A No, but, you know, I thought since I had 02:28:26 and access to them, I'd see what he had to say. Like I 22 say, I found these papers in my own files. I already had them. 24 Q Anything else, any comment on them? 25 A That's all I recall. 02:29:03 26 A No, 1 simply incorporated them into my report. 27 Over. 28 Q Okay. Did you make a record of those comments? 30 Comments? 40 A No, 1 simply incorporated them into my report. 51 Q So — 02:26:22 52 A That's all I recall. 02:29:03 53 comments? 54 A No, 4 to your deposition. Can you identify that for us, please, sir? 55 Q So — 02:26:22 56 A And the e-mails, if they exist, were turned over. 57 over. 58 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to — 10 A Some of them I did, yes. 02:26:27 10 Q Dey our recall what comments he made? 11 Q De you recall what comments he made? 12 A The comment about using sterols was his comment. 11 A Yes. 12 Q You've performed PCA in your work three times; correct; sir? 13 A The was the one who came up with the possibility of sterols — 02:27:05 15 Q And in two of those cases, you employed — you 02:30:19 16 A Yes, he said, why — why is he doing this said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are found in soil? He said, why not use things that are f			3	
20 A Steve Mudge did. 02:26:06 21 Q Did he provided you any comments? 22 A He provided me — yes, he provided me with 23 some comments. 24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12 26 A They would have either been by phone or by 02:26:12 27		vii. Fage) Did anyone review your expert	1	- · · ·
21 Q Did he provided me yes, he provided me with some comments? 22 A He provided me yes, he provided me with some comments? 23 some comments. 24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12	-	e Mudge did 02:26:06	3	•
22		3	8	
23 some comments. Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12 1 e-mail. Q Okay. Did you make a record of those 3 comments? 4 A No, I simply incorporated them into my report. 5 Q So 02:26:22 6 A And the e-mails, if they exist, were turned 7 over. 8 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 4 A Some of them I did, yes. 02:26:27 4 A No Comment about using sterols was his comment. 9 Q Deay or recall what comments he made? 1 Q These both waters and solids? 02:30:14 1 Q De you recall what comments he made? 11 A Yes. 12 Q You've performed PCA in your work three times; comment. 14 Q He was the one who came up with the possibility of sterols 02:27:05 16 A Yes, he said, why -why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 10 Q Okay. And so it was Dr. Mudge who made the 02:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 20 Qokay. And so it was Dr. Mudge who made the 02:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 20 Qokay. Annything else? 24 A Facs 02:31:03			8	•
24 Q In what form; were they verbal or written? 25 A They would have either been by phone or by 02:26:12 162 164 1 e-mail. 2 Q Okay. Did you make a record of those comments? 4 A No, I simply incorporated them into my report. 5 Q So - 02:26:22 5 A No. 4 to your deposition. Can you identify that for us, please, sir? 4 A No, I simply incorporated them into my report. 5 Q So - 02:26:22 5 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to - 9 A Yes. 10 A Some of them I did, yes. 02:26:27 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his comment. 13 comment. 14 Q He was the one who came up with the possibility of sterols - 02:27:05 15 Q And in two of those cases, yee melployed you 02:30:19 signs stand, why why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 2 Q Okay. And so it was Dr. Mudge who made the o2:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 2 Q Okay. And so it was Dr. Mudge who made the o2:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 2 Q The second page is an e-mail from you to Stephen Mudge. Is this where you request him to do the peer review? 2 He was an example, yes. 02:31:03		• ' •	5	
25 A They would have either been by phone or by 02:26:12 164 164 164 164 164 164 164 164 164 164	_		8	•
1 c-mail. 2 Q Okay. Did you make a record of those 3 comments? 4 A No, I simply incorporated them into my report. 5 Q So 02:26:22 6 A And the c-mails, if they exist, were turned over. 7 over. 8 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 10 A Some of them I did, yes. 02:26:27 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his comment. 14 Q He was the one who came up with the possibility of sterols 02:27:05 16 A Yes, he said, why why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 21 A That was an example, yes. 22 A That was an example, yes. 23 A That was an example, yes. 24 Q Okay. And shing a specific figure which 02:27:18 25 A He suggested using a specific figure which 02:27:18 26 Cokay. And you what's marked as Exhibit No. 4 to your deposition. Can you identify that for us, please, sir? 2 No. 4 to your deposition. Can you identify that for us, please, sir? 4 A It's c-mails between Dr. Mudge and myself. 2 Q Okay. I think I tried to put them in 02:30:07 chronological order. Is this first e-mail where you just mention that you were looking for some examples of multimedia PCA? 3 A Yes. 3 Okay. I think I tried to put them in 02:30:07 chronological order. Is this first e-mail where you just mention that you were looking for some examples of multimedia PCA? 4 A Yes. 4 A Yes. 5 Q Okay. And so were an inverse and solids? 5 Q Out've performed PCA in your work three times; 6 of multimedia PCA? 10 Q These both waters and solids? 11 A Yes. 12 Q You've performed PCA in your work three times; 13 correct, sir? 4 A That's correct. 14 A Three different cases, yes. 15 Q And in two of those cases, you employed you 02:30:19 separated water from solids; correct? 16 A That's correct. 17 A That's correct. 28 Q And only	`	•	\$	- •
1 e-mail. 2 Q Okay. Did you make a record of those 3 comments? 4 A No, I simply incorporated them into my report. 5 Q So 02:26:22 6 A And the e-mails, if they exist, were turned 7 over. 8 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to 10 A Some of them I did, yes. 10 A Some of them I did, yes. 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his 13 comment. 14 Q He was the one who came up with the 15 possibility of sterols 16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 poultry waste from soils with sterols? 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. And so is a psecific figure which 25 A He suggested using a specific figure which 26 Q Okay. And so it was psecific figure which 27 Okay. A Yes. 28 Q Okay. And so it was pr. Mudge who made the 29 Q Okay. And so it was a psecific figure which 20 Q Okay. And so it was a psecific figure which 21 Q Okay. Anything else? 22 A He suggested using a specific figure which 25 A He suggested using a specific figure which 26 C I'm going to hand you upusited now unsup election. Can you identify that for 3 us, please, sir? 4 A I'ts co-mails between Dr. Mudge and myself. 5 Q Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 7 just mention that you were looking for some examples 9 of multimedia PCA? 9 Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 9 uput mention that you were looking for some examples 9 of multimedia PCA? 9 Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 9 Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 9 Okay. I think I tried to put them in 02:30:07 7 pust mention that you what's marked as Exhibit. 9 Q Okay. I think I tried	25 A They		25	
1 e-mail. 2 Q Okay. Did you make a record of those 3 comments? 4 A No, I simply incorporated them into my report. 5 Q So - 02:26:22 5 Q Okay. I think I tried to put them in 02:30:07 chronological order. Is this first e-mail shetween Dr. Mudge and myself. 5 Q Okay. So Dr. Mudge comments you did accept over. 8 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to		162		164
2 Q Okay. Did you make a record of those 3 comments? 4 A No, I simply incorporated them into my report. 5 Q So — 02:26:22 5 Q Okay. I think I tried to put them in 02:30:07 chronological order. Is this first e-mail where you just mention that you were looking for some examples of multimedia PCA? 9 A A The comment about using sterols was his comment. 14 Q He was the one who came up with the possibility of sterols — 02:27:05 15 Q And in two of those cases, you employed — you 02:30:19 ike sterols. 10 Q Okay. And so it was Dr. Mudge who made the poultry waste from soils with sterols? 2 No. 4 to your deposition. Can you identify that for us, please, sir? 4 A It's e-mails between Dr. Mudge and myself. 5 Q Okay. I think I tried to put them in 02:30:07 chronological order. Is this first e-mail where you just mention that you were looking for some examples of multimedia PCA? 9 A Yes. 10 Q These both waters and solids? 02:30:14 A Yes. 11 A Yes. 12 Q You've performed PCA in your work three times; correct, sir? 13 correct, sir? 14 Q He was the one who came up with the possibility of sterols — 02:27:05 15 Q And in two of those cases, you employed — you 02:30:19 separated water from solids; correct? 15 Q And only in this case is where you did — you put them together, the water and the solids together; correct? 02:30:26 15 Q That's correct. 16 Q Okay. And so it was Dr. Mudge who made the 02:27:11 20 together; correct? 02:30:26 15 Q That's correct? 02:30:26 16 Q Okay. Anything else? 2 Q Okay. Anything else? 2 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03				
3 comments? 4 A No, I simply incorporated them into my report. 5 Q So — 02:26:22 6 A And the e-mails, if they exist, were turned 7 over. 7 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to — 10 A Some of them I did, yes. 02:26:27 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his 13 comment. 14 Q He was the one who came up with the 15 possibility of sterols — 02:27:05 16 A Yes, he said, why — why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 21 suggestion that you might be able to distinguish 22 Q Okay. And so it was Dr. Mudge who made the 02:27:11 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 3 us, please, sir? 4 A It's e-mails between Dr. Mudge and myself. 5 Q Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 7 just mention that you were looking for some examples 8 of multimedia PCA? 9 A Yes. 10 Q These both waters and solids? 02:30:14 11 A Yes. 12 Q You've performed PCA in your work three times; 13 correct, sir? 14 A There different cases, yes. 15 Q And in two of those cases, you employed — you 02:30:19 16 A That's correct. 17 A That's correct. 18 Q And only in this case is where you did — you put them together, the water and the solids 19 put them together, the water and the solids 20 Q Okay. Anything else? 21 A That was an example, yes. 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A Yes. 02:31:03	1 e-mail.		5	Q I'm going to hand you what's marked as Exhibit
4 A No, I simply incorporated them into my report. 5 Q So 02:26:22 6 A And the e-mails, if they exist, were turned 7 over. 8 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to 10 A Some of them I did, yes. 02:26:27 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his 13 comment. 14 Q He was the one who came up with the 15 possibility of sterols 02:27:05 16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in soil? He 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 26 Colvay. I think I tried to put them in 02:30:07 27 chronological order. Is this first e-mail where you 32:30:10 32:30:26 33 Cornect, sir? 34 A Yes. 35 Q Okay. I think I tried to put them in 02:30:07 39 chronological order. Is this first e-mail where you 30:30:10 4 A It's e-mails between Dr. Mudge and myself. 5 Q Okay. I think I tried to put them in 02:30:07 6 chronological order. Is this first e-mail where you 30:30:10 4 A Yes. 10 Q These both waters and solids? 9 Q You've performed PCA in your work three times; 12 correct, sir? 14 A Three different cases, yes. 15 Q And in two of those cases, you employed you 02:30:19 16 A That's correct. 17 A That's correct. 18 Q And only in this case is where you did you 19 put them together, the water and the solids 19 put them together, the water and the solids 10 together; correct? 11 Q The second page is an e-mail from you to 11 That was an example, yes. 12 Q The second page is an e-mail from you to 12 The second page is an e-mail from you to 13 A Yes. 14 A Three different cases, yes. 15 A That's correct. 16 A That was an example, wes. 17 A That was an example were pounted in the pount of the page of the page o	2 Q Okay	y. Did you make a record of those	2	No. 4 to your deposition. Can you identify that for
5 Q So 02:26:22 6 A And the e-mails, if they exist, were turned over. 8 Q Okay. So Dr. Mudge comments you did accept and make the revisions pursuant to 9 and make the revisions pursuant to 9 A Some of them I did, yes. 02:26:27 10 Q These both waters and solids? 02:30:14 11 Q Do you recall what comments he made? 11 A Yes. 12 A The comment about using sterols was his comment. 13 correct, sir? 14 Q He was the one who came up with the possibility of sterols 02:27:05 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 19 put them together, the water and the solids together; correct? 02:30:26 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 suggestion that you might be able to distinguish poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 22:31:03	3 comment	s?	3	us, please, sir?
6 A And the e-mails, if they exist, were turned 7 over. 8 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to 10 A Some of them I did, yes. 10 Q Do you recall what comments he made? 11 Q Do you recall what comments he made? 12 A The comment about using sterols was his comment. 13 correct, sir? 14 Q He was the one who came up with the possibility of sterols 15 possibility of sterols 16 A Yes, he said, why why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 19 Q Okay. And so it was Dr. Mudge who made the object to gether; correct? 20 Q Okay. And so it was Dr. Mudge who made the object to gether; correct? 21 A That was an example, yes. 22 A He suggested using a specific figure which occurrent over the process of multimedia PCA? 23 A He suggested using a specific figure which occurred that you were looking for some examples of multimedia PCA? 24 Q Okay. Anything else? 25 A He suggested using a specific figure which occurred that you were looking for some examples of multimedia PCA? 25 D A Yes. 6 chronological order. Is this first e-mail where you interact of multimedia PCA? 9 A Yes. 10 Q These both waters and solids? 02:30:14 11 A Yes. 12 Q You've performed PCA in your work three times; correct, sir? 14 A Three different cases, yes. 15 Q And in two of those cases, you employed you occurrent. 16 A That's correct. 18 Q And only in this case is where you did you put them together, the water and the solids together; correct? 19 put them together, the water and the solids together; correct? 20 Q The second page is an e-mail from you to occurrent the process of the pro	4 A No,	I simply incorporated them into my report.	5	A It's e-mails between Dr. Mudge and myself.
7 over. 8 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to	5 Q So	02:26:22	5	Q Okay. I think I tried to put them in 02:30:07
8 Q Okay. So Dr. Mudge comments you did accept 9 and make the revisions pursuant to 10 A Some of them I did, yes. 02:26:27 10 Q These both waters and solids? 02:30:14 11 Q Do you recall what comments he made? 11 A Yes. 12 A The comment about using sterols was his 12 Q You've performed PCA in your work three times; 13 comment. 13 correct, sir? 14 Q He was the one who came up with the 14 A Three different cases, yes. 15 possibility of sterols 02:27:05 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this 16 separated water from solids; correct? 17 analysis based on things that are found in soil? He 17 A That's correct. 18 said, why not use things that are found in animals, 18 Q And only in this case is where you did you 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 10 together; correct? 02:30:26 21 suggestion that you might be able to distinguish 21 A That's correct. 22 poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 Q Okay. Anything else? 24 The suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03	6 A And	the e-mails, if they exist, were turned	3	chronological order. Is this first e-mail where you
9 and make the revisions pursuant to 10 A Some of them I did, yes. 02:26:27 10 Q These both waters and solids? 02:30:14 11 Q Do you recall what comments he made? 11 A Yes. 12 A The comment about using sterols was his 12 Q You've performed PCA in your work three times; 13 comment. 13 correct, sir? 14 Q He was the one who came up with the 14 A Three different cases, yes. 15 possibility of sterols 02:27:05 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this 16 separated water from solids; correct? 17 analysis based on things that are found in soil? He 17 A That's correct. 18 said, why not use things that are found in animals, 18 Q And only in this case is where you did you 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together, the water and the solids 19 put them together; correct? 02:30:26 21 suggestion that you might be able to distinguish 21 A That's correct. 22 poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 Q Okay. Anything else? 24 the peer review? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03	7 over.		7	just mention that you were looking for some examples
10 A Some of them I did, yes. 02:26:27 10 Q These both waters and solids? 02:30:14 11 Q Do you recall what comments he made? 11 A Yes. 12 Q You've performed PCA in your work three times; 13 correct, sir? 14 Q He was the one who came up with the 14 A Three different cases, yes. 15 possibility of sterols 02:27:05 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this analysis based on things that are found in soil? He said, why not use things that are found in animals, like sterols. 19 put them together, the water and the solids 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 20 together; correct? 02:30:26 21 suggestion that you might be able to distinguish poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to Stephen Mudge. Is this where you request him to do 4 the peer review? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03	, ,	y. So Dr. Mudge comments you did accept	3	of multimedia PCA?
11 Q Do you recall what comments he made? 12 A The comment about using sterols was his 13 comment. 14 Q He was the one who came up with the 15 possibility of sterols 02:27:05 16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Q You've performed PCA in your work three times; 27 Q You've performed PCA in your work three times; 28 Q You've performed PCA in your work three times; 29 Q And in two of those cases, you employed you 02:30:19 29 A That's correct. 20 Q And only in this case is where you did you put them together, the water and the solids 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 together; correct? 02:30:26 21 suggestion that you might be able to distinguish poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A He suggested using a specific figure which 02:27:18		e the revisions pursuant to	ž.	
12 A The comment about using sterols was his 13 comment. 14 Q He was the one who came up with the 15 possibility of sterols 02:27:05 16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Q You've performed PCA in your work three times; 27 C You've performed PCA in your work three times; 28 A Three different cases, yes. 29 And in two of those cases, you employed you 02:30:19 29 And in two of those cases, you employed you 02:30:19 20 And only in this case is where you did you put them together, the water and the solids 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 20 together; correct? 02:30:26 21 A That's correct. 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A Yes. 02:31:03	10 A Som	ne of them I did, yes. 02:26:27	10	Q These both waters and solids? 02:30:14
comment. 13 correct, sir? 14 Q He was the one who came up with the 15 possibility of sterols 02:27:05 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Q Signal A Tour waste different cases, yes. 27 A Yes, different cases, yes. 28 A That's correct? 29 And in two of those cases, you employed you 02:30:19 29 And in two of those cases, you employed you 02:30:19 20 And in two of those cases, you employed you 02:30:19 20 And only in this case is where you did you put them together, the water and the solids 29 together; correct? 02:30:26 20 That's correct. 21 A That's correct. 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A Yes. 02:31:03	1 .	ou recall what comments he made?	}	
Q He was the one who came up with the 14 A Three different cases, yes. 15 Q And in two of those cases, you employed you 02:30:19 16 A Yes, he said, why why is he doing this 16 separated water from solids; correct? 17 A That's correct. 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 20 together; correct? 02:30:26 21 suggestion that you might be able to distinguish 21 A That's correct. 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03		comment about using sterols was his	8	
15 possibility of sterols 02:27:05	13 comment.		3	•
16 A Yes, he said, why why is he doing this 17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Oxay. Anything else? 27 A Yes. 28 Separated water from solids; correct? 29 And only in this case is where you did you 29 put them together, the water and the solids 20 together; correct? 20 Q:30:26 21 A That's correct. 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A Yes. 26 O2:31:03	_	vas the one who came up with the	3	A Three different cases, yes.
17 analysis based on things that are found in soil? He 18 said, why not use things that are found in animals, 19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Q And only in this case is where you did you 20 put them together, the water and the solids 21 together; correct? 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 26 Q Okay. Occupants		y of sterols 02:27:05	8	Q And in two of those cases, you employed you 02:30:19
said, why not use things that are found in animals, like sterols. Q Okay. And so it was Dr. Mudge who made the suggestion that you might be able to distinguish A That's correct. Q Okay. Anything else? A He suggested using a specific figure which O2:27:18 Q And only in this case is where you did you put them together, the water and the solids together; correct? O2:30:26 A That's correct. C Q The second page is an e-mail from you to C Stephen Mudge. Is this where you request him to do C Okay. Anything else? C The suggested using a specific figure which C C Stephen Mudge. Stephen Mudge. Is this where you request him to do C Okay. Anything else? C The suggested using a specific figure which C C Stephen Mudge. Stephen Mu	,	he said, why why is he doing this	16	separated water from solids; correct?
19 like sterols. 20 Q Okay. And so it was Dr. Mudge who made the 02:27:11 20 together; correct? 02:30:26 21 suggestion that you might be able to distinguish 21 A That's correct. 22 poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 A That was an example, yes. 23 Stephen Mudge. Is this where you request him to do 24 Q Okay. Anything else? 24 the peer review? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03	1	ased on things that are found in soil? He	5	A That's correct.
20 Q Okay. And so it was Dr. Mudge who made the suggestion that you might be able to distinguish 21 A That's correct. 22 poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 A That was an example, yes. 23 Stephen Mudge. Is this where you request him to do 24 Q Okay. Anything else? 24 the peer review? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03	· · ·	not use things that are found in animals,	18	Q And only in this case is where you did you
21 suggestion that you might be able to distinguish 22 poultry waste from soils with sterols? 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 21 A That's correct. 22 Q The second page is an e-mail from you to 23 Stephen Mudge. Is this where you request him to do 24 the peer review? 25 A Yes. 02:31:03	1	s.	3	put them together, the water and the solids
poultry waste from soils with sterols? 22 Q The second page is an e-mail from you to 23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 26 Q The second page is an e-mail from you to 27 Stephen Mudge. Is this where you request him to do 28 the peer review? 29 The second page is an e-mail from you to 20 Okay. Anything else? 21 Ukayayayayayayayayayayayayayayayayayayay		y. And so it was Dr. Mudge who made the 02:27:11	ş	together; correct? 02:30:26
23 A That was an example, yes. 24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03		n that you might be able to distinguish	3	A That's correct.
24 Q Okay. Anything else? 25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03		vaste from soils with sterols?	22	Q The second page is an e-mail from you to
25 A He suggested using a specific figure which 02:27:18 25 A Yes. 02:31:03		t was an example, yes.	ş	Stephen Mudge. Is this where you request him to do
1	24 Q Oka	y. Anything else?	24	the peer review?
l 163 165	25 A He s	suggested using a specific figure which 02:27:18	25	A Yes. 02:31:03
1 100		163	and a second	165

42 (Pages 162 to 165)

		3	
1	paragraph on Page 241?	1	between cattle and and poultry litter. I don't
2	A In any good EF case, it is necessary to ID a	2	recall if the analysis included wastewater treatment
3	range of potential sources, their proposed pathways,	3	plants or not.
4	and the receptor sites. I assume this was done in	4	Or other sources beyond that, also?
5	the CSM. 02:47:04	5	A Or other sources. I don't believe it included 02:49:22
6	Q Would you stop there, sir? What do you mean	6	native soils.
7	EF case?	7	Q Do you know whether or not there was an
8	A Environmental forensics.	8	analysis done in this case mass balance analysis
9	Q Okay. And was that done by Dr. Olsen in this	9	for sources of bacteria?
10	case? 02:47:10	10	A I don't know. 02:50:04
11	A I don't believe so, no.	11	Q Would you read the next sentence, please?
12	Q You don't believe so?	12	A If this was the driver for the collection of
13	A No, I'm sure it wasn't. He did his own PC	13	data and samples for the PCA, as indicated in the
14	analysis, but none of the other things.	14	Olsen report, why did they not use more specific
15	Q Okay. So when Mr. Mudge says it's necessary 02:47:14	15	markers for fecal material derived from poultry. 02:50:16
16	to ID a range of potential sources, their proposed	16	Q Okay. Did Dr. Mudge review the site
17	pathways and the receptor sites, I assume this was	17	conceptual model in this case?
18	done in the CSM, do you know what Dr. Mudge is	18	A I sent him key sections of Olsen's report, and
19	referring to?	19	I'm not sure if that was one of the sections I sent
20	A I believe he's referring to the work done by 02:47:24	20	or not. 02:50:25
21	CDM.	21	O Did Dr. Mudge have the mass balance work that
22	Q And what does CSM stand for? Does that stand	22	was performed by the other experts for the State in
23	for conceptual site model?	23	this case?
24	A Yes, I believe it does.	24	A I sent him only Olsen materials.
25	Q Okay. So did Dr. Olsen, with CDM's 02:48:05	25	Q Okay. Did you review any of the runoff 02:51:01
	174		176
	T14	. 	
1	assistance, prepare a conceptual site model for this	1	modeling work in this case.
2	case?	2	MS. COLLINS: Object to form.
3	A My recollection is he did.	3	Q (By Mr. Page) Performed by the State?
4	Q And did that conceptual site model identify a	4	A It would refresh my memory if you told me who
5	range of potential sources, the proposed pathways 02:48:10	5	it was by. 02:51:08
6	and receptor sites?	6	Q Dr. Engel.
7	A Not all the potential sources, but some, yes.	7	A No.
8	Q Do you know how Dr. Olsen selected the	8	Q Did Dr. Mudge have that available?
9	potential sources?	9	A I didn't send it to him, so the answer is no.
10	A Well, he selected poultry litter because he 02:48:16	10	Q Okay. Would you read the next sentence, 02:51:13
11	believed from the start that that was the important	11	please?
12	source. He selected cattle manure because that	12	A The most sensible approach I would have
13	seemed unavoidable, that everybody knew there were	13	thought was to analyze and assess for range of
14	cattle in these poultry field, applicated fields.	14	sterols and a few other key organic compounds.
15	The wastewater treatment plants, I don't know why he 02:48:29	15	O Did Dr. Mudge ever tell you what the other key 02:51:23
16	focused on those, but and I don't know why he	16	organic compounds would be?
17	neglected native soils as a source.	17	A I never asked and he never told me, but the
18	Q Okay. Dr. Murphy, did you review any of the	18	idea is clear. You look for things that are
1 -0		8	
19		119	Symptomatic of pounty of at least fiving creatures.
19 20	mass balance work that was performed by Doctors	19 20	symptomatic of poultry or at least living creatures. O Do you know whether or not sterols from 02:51:32
20	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08	20	Q Do you know whether or not sterols from 02:51:32
20 21	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08 A I don't recall doing so.	20 21	• • •
20 21 22	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08 A I don't recall doing so. Q Did you does it help your recollection to	20 21 22	Q Do you know whether or not sterols from 02:51:32 poultry would be any different from sterols from humans?
20 21 22 23	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08 A I don't recall doing so. Q Did you does it help your recollection to know that they did mass balance work for sources of	20 21 22 23	Q Do you know whether or not sterols from poultry would be any different from sterols from humans? A I have not investigated that.
20 21 22 23 24	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08 A I don't recall doing so. Q Did you does it help your recollection to know that they did mass balance work for sources of phosphorus in the IRW?	20 21 22 23 24	Q Do you know whether or not sterols from poultry would be any different from sterols from humans? A I have not investigated that. Q Do you know whether or not sterols from
20 21 22 23	mass balance work that was performed by Doctors Engel and Meagan Smith in this case? 02:49:08 A I don't recall doing so. Q Did you does it help your recollection to know that they did mass balance work for sources of	20 21 22 23	Q Do you know whether or not sterols from poultry would be any different from sterols from humans? A I have not investigated that. Q Do you know whether or not sterols from

45 (Pages 174 to 177)

1	know, we had the earlier discussion about	1 Q If there is a release from land application,
2	transporting particulate matter as well, so solubles	2 if there is any release from poultry growing
3	phosphorus doesn't cover everything.	3 operations, it would more likely be where the land
4	Q (By Mr. Page) So it's your opinion, sir, that	4 application is located; is that correct?
5	particulates on the land would also transport into 03:24:08	5 MS. COLLINS: Object to form. 03:26:26
6	the adjacent rivers and streams?	6 A That seems reasonable to me, but I haven't
7	MS. COLLINS: Object to form.	7 looked into it.
8	A I think that's likely, yes. There's going to	8 Q (By Mr. Page) Have you evaluated the chemical
9	be erosion both from land and from river banks,	9 composition of cattle waste?
10	particularly during high flow conditions. 03:24:16	10 A Only to the extent that it's in my PCA 03:27:09
11	Q And would you suppose, sir, that erosion or	11 analysis.
12	particulates from litter would be the would run	12 Q You've not done any evaluation of the
13	off in land applied litter areas?	13 constituents compared to the poultry waste
14	A I don't know what the relative proportions	14 constituents to see if there are any differences?
15	would be. 03:24:26	15 A Only through the PCA analysis. 03:27:15
16	Q They would both likely run off in your	16 Q Did you compare the SPLP analysis between
17	scenario?	17 poultry and cattle?
18	A It's possible for both to run off, yes.	18 A Only through the PC.
19	O Do you know whether or not and this may be	19 Q Did you ever look and see whether there's a
20	redundant, I apologize for this, I just want to make 03:25:05	difference in the leaching characteristics between 03:27:20
21	sure I've covered it, do you know whether or not	21 poultry and cattle waste?
22	poultry waste is typically applied within a few	22 A Only through the PCA.
23	miles of the poultry house where it's produced?	23 Q Can you tell us what your understanding of the
24	MS. COLLINS: Object to form.	24 native soils are in the IRW?
25	A I don't believe I have any information on 03:25:12	25 A I've seen them described as turkey soils. I 03:28:02
23	198	200
	130	200
1	1	don't know the extent to which that applies, to the
1	where poultry waste was applied, and in saying that,	2 entire IRW or just a portion, but that's the
2	I want to correct my early statement that Randy	description I've seen.
3	O'Boyle indicated to me where it was applied on the	4 Q Okay. Do you know anything about the
4	Cargill growers. He, in fact, did not. It was the poultry houses he identified for me. 03:25:21	5 geological formations in the IRW? 03:28:09
5	poulty nouses no trems.	6 A I know that it's a limestone and that it's a
6	Q And so you don't know, when you try to	7 limestone that has gaps in it, fractures and pits
7	determine a downstream impact, whether or not the	8 and so on.
8	litter from those houses had been applied in the	
9	same areas those houses are located in?	9 Q In your experience, would such a geological 10 formation be conducive to infiltration of water in 03:28:17
10	A I don't know where the litter was applied. 03:25:28	11 subsoil areas?
11	Q In order to determine impact from Cargill	
12	operations, which is more important in your opinion,	
13	where the litter is land applied or where the	13 Q Have you heard have you have you heard the IRW geology to be referred to as a mantled
14	chickens are grown?	
15	MS. COLLINS: Object to form. 03:26:05	}
16	A They're turkeys, not chickens.	
17	Q Where the poultry is grown?	if I've heard the phrase mantled Karst.
18	MS. COLLINS: Same objection.	18 Q What is Karst, sir?
19	A Well, if the turkey litter is a source, a	19 A Karst is the situation I just described of
20	significant source, then you'd want to know where 03:26:12	
21	it's applied, and look downstream from that. The	21 Q Would turkey soil facilitate runoff?
22	house, per se, is not a source.	22 A Probably not as much as some other soils.
23	Q It's still released from the house, as far as	23 Q Which soils would have greater runoff in your
24	you're aware of?	24 opinion than turkey soils?
25	A I haven't seen any discussed. 03:26:19	25 A I think high organic soils, farming soils. 03:29:14
1	199	201
	•	201

51 (Pages 198 to 201)

$\overline{}$		3	
1	runoff, septic tanks, et cetera, to the same degree	1	Q (By Mr. Page) Okay. Would you also agree
2	as other locations.	2	that you would like to derive source patterns
3	Q Would you stop there, please, sir? Do you	3	directly from analysis of ambient data?
4	know whether or not any such locations exist that	4	MS. COLLINS: Object to form.
5	could be sampled within the IRW? 04:00:28	5	Q (By Mr. Page) In the context of principal 04:05:01
6	A I have not investigated that.	6	components analysis?
7	Q And why would it be important in your mind to	7	A Well, again, Glenn's chapter is about more
8	evaluate as a reference condition an area that's	8	than principal component analysis, it's also about
9	unaffected by poultry litter but affected by other	9	polytopic vector analysis and other methods where
10	factors such as wastewater treatment plants? 04:01:06	10	you can identify sources directly from the data. 04:05:09
11	A To find out what background is.	11	Principal component analysis, you can't.
12	O Couldn't you find out what background is by	12	O You can identify groups of samples that appear
13	locating an area that has no sources whatsoever	13	to be related to the same source; correct, principal
14	contributing to it?	14	component analysis?
15	A You could, particularly if you took edge of 04:01:15	15	A You can identify groups of samples that behave 04:05:17
16	field samples in those locations.	16	as if they were or analytes that behave as if
17	Q What about streams in those locations, do they	17	they were coming from the same source.
18	also represent background in streams?	18	Q And that would be a piece of evidence to
19	A They represent stream background, yes.	19	determine source identification and evaluation,
20	Q Do you know whether or not wastewater 04:01:23	20	would it not? 04:05:23
21	treatment plants, urban runoff or septic tanks are	21	A It could be a piece of evidence, yes.
22	significant sources of phosphorus to the IRW rivers	22	Q Let me hand you what's been marked as Murphy
23	and streams?	23	Exhibit 8, and I can tell you, Dr. Murphy, that
24	A I have not investigated that.	24	these are pages from Dr. Engel's expert report in
25	Q If a chemical of concern is phosphorus, would 04:02:01	25	this case. Have you testified you have reviewed Dr. 04:06:17
1	214	100	216
·····		· †	
1		5	
1	that information be important to how you construct	1	Engel's report?
1 2	that information be important to how you construct your evaluation as to source contributions?	1 2	Engel's report? A I testified that I had not.
1		,	• .
2	your evaluation as to source contributions?	2	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken?
2 3	your evaluation as to source contributions? A Not from my evaluation, which is strictly in	2	A I testified that I had not. Q I thought it was listed in your considered
2 3 4	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis.	2 3 4 5 6	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it.
2 3 4 5	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11	2 3 4 5	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24
2 3 4 5 6	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your	2 3 4 5 6 7 8	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it,
2 3 4 5 6 7	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. O Would that be important, based on your knowledge of environmental forensics, for	2 3 4 5 6 7	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir?
2 3 4 5 6 7 8	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. O Would that be important, based on your knowledge of environmental forensics, for determining source?	2 3 4 5 6 7 8 9	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05
2 3 4 5 6 7 8 9	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. Output Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be.	2 3 4 5 6 7 8 9 10	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to
2 3 4 5 6 7 8 9	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can	2 3 4 5 6 7 8 9 10 11 12	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you
2 3 4 5 6 7 8 9 10 11 12	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. O Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. O Isn't it true, sir, that principal component analysis, the best types of samples are those that	2 3 4 5 6 7 8 9 10 11 12 13	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass
2 3 4 5 6 7 8 9 10 11 12 13 14	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves?	2 3 4 5 6 7 8 9 10 11 12 13 14	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the
2 3 4 5 6 7 8 9 10 11 12 13 14	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29	2 3 4 5 6 7 8 9 10 11 12 13 14 15	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA?
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13 MR. ELROD: Object to the word a priori.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27 the information and see if it's correct.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13 MR. ELROD: Object to the word a priori. A It sounds like you're quoting from something	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27 the information and see if it's correct.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13 MR. ELROD: Object to the word a priori. A It sounds like you're quoting from something written by Glenn Johnson. I'd have to see the	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27 the information and see if it's correct. Q Okay. Let's assume it's correct. A If we assume it's correct, then I would say
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13 MR. ELROD: Object to the word a priori. A It sounds like you're quoting from something written by Glenn Johnson. I'd have to see the statement in its full content, but I don't disagree	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27 the information and see if it's correct. Q Okay. Let's assume it's correct. A If we assume it's correct, then I would say that poultry would be a reasonable thing to look at.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	your evaluation as to source contributions? A Not from my evaluation, which is strictly in the context of principal component analysis. Someone else could do that evaluation. 04:02:11 Q Would that be important, based on your knowledge of environmental forensics, for determining source? A It could be. Q Isn't it true, sir, that principal component analysis, the best types of samples are those that are ambient water samples from which you can determine, or sources based on the ambient waters themselves? A I either don't understand the question or I'm 04:02:29 drawing a complete blank on the answer. Q Would you agree, sir, that in environmental forensics investigations, the investigator rarely has a priori knowledge of all sources? MS. COLLINS: Object to form. 04:04:13 MR. ELROD: Object to the word a priori. A It sounds like you're quoting from something written by Glenn Johnson. I'd have to see the	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A I testified that I had not. Q I thought it was listed in your considered materials in this case; was I mistaken? A I think I received it, but I didn't I don't 04:06:24 recall reviewing it. MS. COLLINS: I don't think so. Q (By Mr. Page) You don't recall reviewing it, sir? A I do not. 04:07:05 Q Let me ask you this, sir. Would you turn to the third page, which is a pie chart. Could you identify what Dr. Engel has identified as mass balance as the leading sources of phosphorus in the IRW? 04:07:15 A He identifies the leading source as poultry. Q By review of this would this type of information in this pie chart help you determine which sources you should evaluate through a PCA? A I think before I did that, I'd want to look at 04:07:27 the information and see if it's correct. Q Okay. Let's assume it's correct. A If we assume it's correct, then I would say

55 (Pages 214 to 217)

			_
1	would one that shouldn't be overlooked.	1	Q I didn't suggest that.
2	Q Based on this information in Exhibit 8, are	2	A Okay.
3	there any other sources that you would feel	3	Q What I'm suggesting is is that if a particular
4	important to look at in an evaluation of PCA?	4	source in the a source of contamination in the
5	MS. COLLINS: You're limiting his answer 04:08:12	5	IRW contributes very few contaminants, would you 04:11:11
6	to sources reflected in this document?	6	expect to see that source a PC identify with that
7	MR. PAGE: Yes.	7	source in your PCA?
8	A Okay. So I won't mention native soils, then,	8	MS. COLLINS: Object to form.
9	since it's not reflected here. Commercial	9	A I would not find a PC identified with any
10	fertilizer shows up in his pie chart, dairy cattle 04:08:18	10	source because to me, principal components do not 04:11:19
11	show up, human, which I imagine is wastewater	11	represent sources. They are totally mathematical
12	treatment plants but I don't really know, or maybe	12	constructs. They don't represent sources.
13	septic tanks, those seem to be the other major	13	Q (By Mr. Page) Would you expect to see a PC
14	sources in his pie chart. Whether they are in	14	associated with a source that had very few
15	reality or not, I don't know. 04:08:32	15	contaminants contributed? 04:11:26
16	Q (By Mr. Page) If those sources are in fact	16	MS. COLLINS: Object to form.
17	significant contributors, would you expect to find a	17	A I'm not sure I know what associated with means
18	pattern in a PCA analysis of ambient waters in the	18	either. PC can tell you what samples are related to
19	watershed?	19	what other samples, that is, have the same
20	MS. COLLINS: Object to form. 04:09:08	20	signature, and it can tell you what analytes behave 04:12:07
21	A You're always going to find a pattern in a PCA	21	as if they had a common source, but it doesn't
22	analysis.	22	identify sources.
23	Q (By Mr. Page) Would they be identified as a	23	Q (By Mr. Page) Would you expect to find a
24	significant PC if they were significant sources of	24	signature, a PC signature, a term you just used, for
25	contamination? 04:09:14	25	a contaminant source that contributes very minimal 04:12:13
	218	ļ	220
1	A Not if you're well, if you're just looking	1	contaminants to the ambient waters?
2	at ambient waters, it's hard for me to see how PC	2	MS. COLLINS: Object to form.
3	analysis can identify sources. You're going to have	3	A It's possible because PC is about variability,
4	to look at sources, too.	4	not about total concentration.
5	Q Wouldn't the ambient waters, if you did a PCA 04:09:32	5	Q (By Mr. Page) Can total concentration affect 04:12:21
6	analysis of ambient waters, wouldn't it be able to	6	variability?
7	determine, based on principal components it	7	A It can.
8	identified, separate groups of samples that were	8	Q Did you have any mass balance information
9	contaminated by a similar source?	9	available to you for your evaluation, sir?
10	A It would show you which sources are related 04:10:10	10	MS. COLLINS: Object to form. 04:13:09
11	which samples are related to which other samples.	11	A I don't recall. I certainly didn't use any
12	It would tell you which chemicals behave as if they	12	mass balance information. I don't recall seeing
13	had a common source, but it wouldn't tell you what	13	any.
14	that source is.	14	Q (By Mr. Page) Did you have any modeling
15	Q Okay. And would you expect that if there was 04:10:17	15	information available to you, sir, that is a runoff 04:13:18
16	a source in the IRW that was a very small	16	model?
17	contributor to contaminants, would you expect that	17	A I suppose it was available to me in the sense
18	to have an influence that you could see in a PCA	18	that I had access to Dr. Engel's report, but it
1 10	analysis?	19	wasn't germane to what I was doing.
1		20	Q Is that because you're simply focusing on PCA? 04:13:26
19	MS. COLLINS: Object to form. 04:10:28		
19 20	<u> </u>	21	A And the specific measurements that were taken
19 20 21	A Well, it could be a small contributor for	8	A And the specific measurements that were taken at the Cargill growers, focusing on two things.
19 20 21 22	A Well, it could be a small contributor for phosphorus, which is only one analyte, and your PC	21	•
19 20 21 22 23	A Well, it could be a small contributor for phosphorus, which is only one analyte, and your PC analysis typically has 20, 30 analytes, so it could	21 22	at the Cargill growers, focusing on two things.
19 20 21 22	A Well, it could be a small contributor for phosphorus, which is only one analyte, and your PC	21 22 23	at the Cargill growers, focusing on two things. Q Would the mass balance information that's

56 (Pages 218 to 221)

		3	
1	MS. COLLINS: Object to form.	1	Q Can you derive source patterns in PCA?
2	A It could if it's correct, but I have no idea	2	A I don't believe so.
3	if it's correct or not.	3	Q You don't believe you can?
4	Q (By Mr. Page) Could it help you interpret PCA	4	A Not really, it's not set up to do that.
5	results for the IRW? 04:14:11	5	It's constrained by having the PCs be orthogonal to 04:18:02
l		6	each other, and because of that constraint, the PCs
6	MS. COLLINS: Object to form.	7	don't generally correspond to sources.
l	A It's conceivable. I don't know what the	8	Q Okay. Can you do you agree that if
8	report looks like. And in the absence of any	9	possible, you would like to derive source patterns
9	information, I can't reject it out of hand. O (By Mr. Page) Let me hand you what's been 04:14:24	10	directly from analysis of ambient data, do you agree 04:18:10
10	(=)	11	with that statement?
11	marked as Exhibit 9. Can you identify that, sir?	12	A Yes.
12	A It's selected pages from a book that I edited	13	
13	called Introduction to Environmental Forensics,	8	_
14	Second Edition.	14	statement is applicable also to PCA analysis? A Source patterns, but not determining sources. 04:18:18
15	Q And Chapter 7 is entitled what, sir? 04:16:05	15	5
16	A Principal components analysis and receptor	16	That's why it's in this section of his chapter and
17	models in environmental forensics.	17	not in the earlier PCA section.
18	Q Okay. I selected a page from that report,	18	Q So for PCA analysis, is it important to have a
19	sir, it's Page 234, it's the next page following	19	sample collection from all sources in order to do a
20	that chapter heading. 04:16:15	20	PCA analysis? 04:19:03
21	A Right.	21	MS. COLLINS: Object to form.
22	Q Would you read the first two sentences	22	A I think that's generally the case, yes.
23	excuse me, three sentences of the second full	23	Q (By Mr. Page) So you think it's necessary to
24	paragraph on page 234?	24	have a sample from all sources in order to do a PCA
25	A In assumption of the conceptual mixing 04:16:20	25	analysis? 04:19:11
	222	\$	224
		·}·····	
1	models	1	A I would say it's useful. If your if your
2	Q I'm sorry, the next paragraph.	2	PC analysis is dominated by transport phenomena
3		3	rather than by sources, it won't matter whether you
1	A After the choice of K, see section 724, the	4	have all sources or not because it will be simply
4	receptor model then resolves the chemical composition of sources F, and the contribution of 04:16:26	5	how chemicals partition different ways in different 04:19:18
5	*************************************	6	media.
6	the sources in each of the samples A. Recall,	7	
7	however, that in environmental forensics	8	Q Are you aware of investigators that have
8	investigations, we rarely have a priori knowledge of	9	published peer review reports where they did not
9	all sources. If possible, we would like to derive	ž.	have samples for all the sources they were
10	source patterns directly from the analysis of 04:17:02	10	investigating? 04:19:25
11	ambient data.	11	A For a PCA analysis?
12	Q Could you stop there? Do you know what the	12	Q Yes.
13	author means by if possible, we would like derive	13	A I'm not surprised, but I wouldn't think they
14	source patterns directly from analysis of ambient	14	could draw conclusions about the sources they hadn't
15	data? 04:17:09	15	investigated. 04:20:04
16	A This is in his section on self-training	16	Q Could they not identify which components for a
17	receptor modeling methods. It's not about PCA. PCA	17	PC loaded the highest and then compare those
18	is described in earlier pages, 214 through 232, so	18	loadings with what they knew about the constituents
19	this is in the context of things like polytopic	19	in a potential source?
20	vector analysis. What he's saying, within the 04:17:17	20	A Again, loadings don't have to do with 04:20:16
21	context of the measurements themselves, you can	21	concentrations, they have to do with what's
22	determine how many sources there are, what the	22	contributing to variability.
23	composition of the sources is, and how much each	23	Q Have you seen investigators in published
24	source is contributing to each measurement, and you	24	reports on PCA, principal component analysis,
25	do that by relaxing some of the constraints on PCA. 04:17:25	25	evaluating loadings to determine sources? 04:20:25
	223		225
L			

57 (Pages 222 to 225)

TYSON FOODS, INC., et al,

Defendants.

IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OKLAHOMA W. A. DREW EDMONDSON, in his) capacity as ATTORNEY GENERAL) OF THE STATE OF OKLAHOMA and) OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT,) in his capacity as the TRUSTEE FOR NATURAL RESOURCES) FOR THE STATE OF OKLAHOMA, Plaintiff,) 4:05-CV-00329-TCK-SAJ vs.

VOLUME II OF THE VIDEOTAPED DEPOSITION OF BRIAN MURPHY, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 26th day of March, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

BRIAN MURPHY, PhD, Volume II, 3-26-09

1	A On runoff, yes.	1 does that mean you would go farther distances away?
2	Q What about leaching?	2 A No. These are these are nearby surface
3	A Well, of course, over time the leachate is	3 water, surface soil samples and or surface water
4	going to spread the contamination downwards, and so	4 or spring or sediment samples.
5	after a long enough time it may very well be that 08:59AM	5 Q How do you I'm sorry. Finish, please. 09:02AM
6	the two to four is more significant than the zero to	6 A Exactly how far downstream they are, I'd have
7	two because the soluble components have been	7 to ask Randy O'Boyle, but what we were trying to do
8	transported downward.	8 is identify any place that could possibly have a
9	Q So you'd want to take some look at the soluble	9 Cargill impact and see if those stood out from other
10	components of interest and see if they've been 08:59AM	10 samples. 09:03AM
11	transported, but generally, at least for current	11 Q Stood out in what respect?
12	land application, the zero to two-inch layer would	12 A Had a different PC signature.
13	have the most impact on leaching?	13 Q Did you do any comparison with respect to
14	A For fresher applications, yes.	14 concentrations of, for example, phosphorus, any of
15	O So it wouldn't the zero to two-inch soils 08:59AM	15 the water and the sediment? 09:03AM
16	be the most applicable to determine effects on the	16 A My analysis has been totally in the context of
17	environment from land application soils?	17 principal component analysis.
18	MS. COLLINS: Object to form.	18 Q So the answer is no?
19	A That would generally be the case, not in the	19 A That's correct.
20	context of PCA analysis necessarily, but as a 09:00AM	20 Q What was what was your instructions to Mr. 09:03AM
21	general matter, yes.	21 O'Boyle concerning trying to be near to the down
22	Q Can we turn to Table 3-3 of your report, sir?	22 I think the sampling location nearby?
23	I think it's on Page 22, sir. Would you explain	23 A I don't recall I gave him instructions in
24	Table 3-3 for the Record?	24 terms of how near was near, you know, in terms of
25	A Table 3-3 is based on information I received 09:01 AM	25 how many miles. 09:03AM
-		298
ļ	296	250
1	from Randy O'Boyle, and it shows sample locations	1 Q Would eleven miles be nearby?
2	downstream or downgradient of the various Cargill	2 A I'm not sure if it would or wouldn't.
3	-	3 Q Did he select the closest sampling location?
4	contract growers. Q Okay, and how were these sample locations	4 A I believe he tried to, yes.
5	Q Okay, and how were these sample locations selected? 09:01AM	5 Q Were these all were these all of the 09:04AM
6	A They were selected by Randy O'Boyle.	6 Cargill growing operations?
7		7 A That was the intention, yes.
8		8 Q So this represents all 35, Table 3-3?
9	-	9 A That was the intention.
1	Cargill growers. O Was there any other criteria? 09:01AM	10 Q Doesn't appear that there's 35 operations on 09:04AM
10		this table, does it?
11 12	A Not that I'm aware of. I think the instructions were to be generous in deciding what	12 A No.
	_	13 Q So can you tell us what's missing?
13	was downstream or downgradient.	14 A I don't know which ones are missing. I think
14	Q What do you mean by generous? A Oh if there was an issue as to whether 09:01AM	15 if you compare the list of Cargill contract growers 09:04AM
1		here with the total list, you'd be able to see which
16	something was downgradient. For example, if it was	ones are missing because the third column gives you
17	a little bit off the direction of groundwater flow, to still consider it downgradient, that a plume that	the names of the growers.
18		
19	was spreading could possibly impact that location. O What about for surface samples: what were the 09:02AM	19 Q Did you do that analysis? 20 A I did not. 09:04AM
20		1
21	criteria?	· · · · · · · · · · · · · · · · · · ·
22	A Again, just to be generous in deciding which	
23	surface samples were downstream or downgradient,	23 of these locations? 24 A Since I don't know the locations, and I don't
24	downstream.	· · · · · · · · · · · · · · · · · · ·
25	Q So you would look when you say generous, 09:02AM	200 00000000000000000000000000000000000
1	297	299

4 (Pages 296 to 299)

BRIAN MURPHY, PhD, Volume II, 3-26-09

1	application was, they're they're downgradient or	1 A Assuming everything you say is true, that
2	downstream of the houses.	2 would be correct.
3	Q So the answer is no?	3 Q What are the differences in phosphorus between
4	A That's correct.	4 the two sample locations?
5	Q And did the analysis that you performed 09:05AM	5 MS. COLLINS: Object to form. 09:09AM
6	consider whether there was any other poultry litter	6 A The Spring 04 Anderson non-filtered has a
7	from any of the other of the defendants upgradient	7 phosphorus level of .69 milligrams per liter;
8	from these locations?	8 whereas, the Spring Anderson has a phosphorus level
9	A I don't believe it did.	9 of .014 milligrams per liter.
10	Q Did it consider any of the timing of poultry 09:05AM	10 Q How far away from the Lester facility is the 09:09AM
11	litter application around or near these locations?	11 Spring Anderson, the location that's identified on
12	A I don't believe it did. It's strictly a	12 Table 3-3 of your exhibit?
13	spatial analysis.	13 MS. COLLINS: Object to form.
14	Q We took a look at a couple of these to	14 A It looks like, based on the key from this map,
15	evaluate your criteria, Dr. Murphy. Let me hand you 09:06AM	15 and, again, assuming everything is accurate, perhaps 09:10AM
16	what's marked as Exhibit 19, and I can tell you that	16 25 miles.
17	this is a map of the IRW. Do you recognize that,	17 Q On Table 3-3 where you've got a notation for
18	sir?	18 location, is that your is that your sample ID
19	A Yes.	19 reference?
20	Q And do you recognize the Lester location here? 09:07AM	20 A It's the sample ID that I reference that I 09:10AM
21	A I see it on the map, yes.	21 received from Randy O'Boyle and used to circle the
22	Q From your work, do you recognize that as being	22 various locations as being downstream or
23	the location of the Lester grower for Cargill?	23 downgradient.
24	A I wouldn't be able to say yes or no.	24 Q Did you check any of his work?
25	Q Okay. Well, I'll represent to you that we 09:07AM	25 A I have not. 09:10AM
	300	302
•••••		
1	identified that, and best of my knowledge it's been	1 Q Just let me look at one other example. Let me
2	properly identified. Is Lester one of the people	2 hand you what's marked as Exhibit 20, sir. Sir,
3	that you've looked at as part of your analysis on	3 this is a GIS picture of within the IRW showing
4	Page 22, Table 3-3?	4 the Edwards facility, and then sample locations that
		3
5	A Lester appears on Table 3-3. 09:08AM	5 would be downgradient from the facility, along with 09:11AM
5 6	A Lester appears on Table 3-3. 09:08AM Q Okay, and what is the spring ID that you	3
	11 Double appears on Table 5 5	5 would be downgradient from the facility, along with 09:11AM
6	Q Okay, and what is the spring ID that you	would be downgradient from the facility, along with 09:11AM their sample IDs, and also the results from samples
6 7	Q Okay, and what is the spring ID that you looked at?	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the
6 7 8	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring.	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM
6 7 8 9	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the
6 7 8 9	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM
6 7 8 9 10 11	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this
6 7 8 9 10 11	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't youch for the accuracy of the map, but it certainly is not the closest	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information
6 7 8 9 10 11 12	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location.	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the
6 7 8 9 10 11 12 13	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case.
6 7 8 9 10 11 12 13 14	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 09:12AM
6 7 8 9 10 11 12 13 14 15	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection.	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility?
6 7 8 9 10 11 12 13 14 15 16	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson,	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table
6 7 8 9 10 11 12 13 14 15 16 17	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson, however. So it's unclear to me which location is	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir,
6 7 8 9 10 11 12 13 14 15 16 17 18	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson, however. So it's unclear to me which location is being used. They're both Anderson.	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir,
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson, however. So it's unclear to me which location is being used. They're both Anderson. Q Okay. If in fact, you used sample ID Spring 09:08AM Anderson, which is shown on the Oklahoma portion,	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir, 20 please, in red? 09:12AM
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson, however. So it's unclear to me which location is being used. They're both Anderson. Q Okay. If in fact, you used sample ID Spring 09:08AM Anderson, which is shown on the Oklahoma portion, you'll admit to me, sir, if that's accurately shown,	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir, 20 please, in red? 09:12AM 21 A (Witness complied).
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? Ose Where does the Anderson spring ID show up on this map at Exhibit 19? Ose Where does the Anderson spring ID show up on this map at Exhibit 19? Ose	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir, 20 please, in red? 09:12AM 21 A (Witness complied). 22 Q Okay. Is it the only sample location that's
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Q Okay, and what is the spring ID that you looked at? A The spring is Anderson spring. Q Okay. Where does the Anderson spring ID show up on this map at Exhibit 19? 09:08AM A Well, again, I can't vouch for the accuracy of the map, but it certainly is not the closest location. Q In fact, there was another one called Spring 04 that would be closer; correct, sir? 09:08AM MS. COLLINS: Objection. A Yes. It's the sample ID is also Anderson, however. So it's unclear to me which location is being used. They're both Anderson. Q Okay. If in fact, you used sample ID Spring 09:08AM Anderson, which is shown on the Oklahoma portion, you'll admit to me, sir, if that's accurately shown,	5 would be downgradient from the facility, along with 6 their sample IDs, and also the results from samples 7 taken from those locations. 8 MS. COLLINS: Object to form. Object to 9 the use of this exhibit without providing the 10 information that generated it. 09:11AM 11 MR. PAGE: I'll just represent to you this 12 is information that was taken from information 13 provided to the defendants during the course of the 14 discovery of this case. 15 Q Can you identify on this map, sir, the sample 16 location that you used for the Edwards facility? 17 A Well, assuming that it's what's given in Table 18 3-3, it would be SD 062. 19 Q Would you circle that on the exhibit, sir, 20 please, in red? 09:12AM 21 A (Witness complied). 22 Q Okay. Is it the only sample location that's 23 downgradient from Edwards?

5 (Pages 300 to 303)

BRIAN MURPHY, PhD, Volume II, 3-26-09

		1	
1 sources.		1	A Yeah. Whether he did it correctly either way
2 Q Okay, sir. Let me hand y	ou what's been marked	2	is a different issue.
3 as Exhibit 32 and, sir, this is th	e corrected scores	3	Q On Page 30 of your report, Dr. Murphy, you
4 plot now but it's not the expand	led view, so that's	4	reference a couple of examples by citing papers of
5 why the figure is a little differen	nt label at the 01:51PM	5	successful use of multimedia PCA analysis; correct? 01:55PM
6 bottom. It's 6.11-18D, and so the		6	A Yes.
7 transformation has been correct	ted, and I want to ask	} 7	Q Do you know whether in all circumstances
8 you to do the same thing. Wou	ld you please draw a	8	multimedia analysis is appropriate for PCA?
9 circle around the three differen		9	A No. I would say it's not going to be very
10 them?	01:51PM	10	useful when the patterns between contaminants change 01:55PM
11 MS. COLLINS: I repeat m	y standing	11	from media to media because of fate and transport
12 objection from earlier as to the nat		12	differences.
13 exhibit.		13	Q Okay.
14 MR. PAGE: Save the speed	ch and save the	14	A At least it's not going to be useful for
15 time.	01:51PM	15	determining sources. It may be useful for defining 01:55PM
16 MS. COLLINS: Also object	t to form.	16	fate and transport differences.
17 Q Would you also label then		17	Q Well, if you can connect the source to the
18 A (Witness complied).	., 311 .	18	place where the transformation occurred, then you
	mnles also?	19	could still make that linkage, could you not?
Q And then the reference saA (Witness complied).	01:52PM	20	MS. COLLINS: Object to form. 01:56PM
• •		21	A You mean along the part of the pathway where
Q I don't believe you labele		22	are there are no differences?
22 Exhibit 31. Would you do tha	raiso for me?	23	
23 A Yes.	41	24	Q Yeah.A You could do an analysis on that part of the
24 Q Thank you, sir. Okay. D		25	
25 the transformation, do you also	o find that there are 01:52PM	23	pulling.
4.0			410
1 three concrete groups for thes	o throe canarata	1	MR. PAGE: Can we go off the Record a
1 three separate groups for thes	e tifree separate	2	minute?
2 source categories?	. 6	3	VIDEOGRAPHER: We are now off the Record.
3 MS. COLLINS: Object to		4	The time is 1:57 p.m.
4 A Well, they're not really sep		5	(Following a short recess at 1:57 p.m., 01:57PM
5 there's some other kinds of samp		6	proceedings continued on the Record at 2:03 p.m.)
6 they the figures I do I did dr		7	VIDEOGRAPHER: We are back on the Record.
7 are in relative position to each of		ş	
8 Q And so there's not an ove	erlap between the	8	The time is 2:03 p.m.
9 different groups, is there?		9	Q Dr. Murphy, I located a copy of the report I wanted to ask you about. Let me hand you Exhibit 33 02:03PM
10 A Not in either figure, no.	01:53PM	10	,
11 Q So is it fair to conclude t		11	and ask you to identify that for the Record.
12 unfortunate, the mathematica		12	A It's a paper called Patterns and Sources of
13 affect Dr. Olsen's ability to in	terpret these scores	13	Polychlorinated Dibenzo-p-dioxins and Dibenzofurans
14 plots?		14	Found in Soil and Sediment Samples in Southern
15 MS. COLLINS: Object to		15	Mississippi. 02:03PM
16 A This is the plot just for sur		16	Q And was this paper one of the ones that you
17 I'd need to see what the original		17	cited as representative of multimedia analysis?
18 versions looked like for the othe	r runs, the SD 1	18	A I believe it is, yes.
19 and so on.		19	Q Okay. Take a moment to take a look at it and
20 Q But for the surface wate	rs, would you 01:53PM	20	I want to ask you a few questions. 02:04PM
20 Q But for the surface wate	lustering is about	21	A All right.
21 A For the surface water, the c		22	Q What were the multiple medias evaluated in
· •		} ~~	•
21 A For the surface water, the	rpretation either way;	23	this particular work?
A For the surface water, the control of the same.	rpretation either way;	į.	this particular work? A They're shown in Table 1. There's pulp mill
A For the surface water, the course the same. 23 Q So you could do the inte		23	this particular work?

32 (Pages 408 to 411)